Popular Mechanics Magazine

REGISTERED IN U. S. PATENT OFFICE

WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 27 MARCH, 1917 No. 3

Girl Diver Clears Rocks by Narrow Margin

NOT long ago a rather interesting problem was encountered in the course of filming a photoplay on the island of Jamaica, in which one of America's foremost women divers assumed the leading rôle. A large concrete tower had been erected on a coral ledge, and from one of its windows, at an elevation of about 45 feet, the performer was to plunge into the sea below. The base of the structure was about 12 feet from the edge of the reef, which it had been estimated could easily be cleared. Instead of being perpendicular, however, the walls slanted back—for the tower was pyramidal—so that in reality the window from which the dive was to be made was about 24 feet from the outer margin of the coral shelf. Measurements and tests of different sorts indicated that it would be extremely hazardous, if not even suicidal, to attempt the feat from the elevation afforded. Six-foot platforms

The Platform from Which the Dive was Made Extended Out Far Enough to Enable the Girl toClear the Ledge Below. Even at That, the Plunge, Although Picturesque and Graceful, Was Not Devoid of Danger

Newsdealers will have the April issue of Popular Mechanics Magazine on sale March 20th.

were therefore built out from the windows and the difficulty overcome. Owing, however, to the influence of a strong wind, the girl managed to clear the rocks only by a short distance when the dive was at last executed. This was final proof that the plunge as first planned would have been fatal.

CIPHER-WRITING MACHINE TO GUARD SECRETS

Letters and telegrams that it would puzzle the most expert European censor to decipher can now be exchanged

This Cipher Typewriter was Made for One of the Allied Governments Now at War: The Disk Which Determines the Cipher and Also Deciphers the Message on Receipt is Placed on the Top Plate between the Ribbon Spools

by business men who wish to keep the contents confidential. A typewriter recently placed on the market not only writes in cipher, but makes its own cipher and offers millions of possible combinations for choice. In general appearance the machine resembles an ordinary typewriter, and to make a cipher the message is written on its keyboard in the ordinary way. The cipher is determined by a detachable plate or disk, containing 30 holes in two concentric circles of 15 holes each. For each of these holes there is a pin and to make a cipher combination these pins may be inserted in or left out of any of the holes, as fancy dictates. Then, in writing the copy, the machine may write an "x" for an "a" the first time it occurs, then a "p," and so on. It is impossible to predetermine what code letters will appear in operating the machine. To decipher a code message the person receiving the communication must have a complementary disk, with pins properly arranged, and one of the machines to reproduce the message as originally written.

WOOD-CUTTING DIES TAKE PLACE OF SAWS

Especially designed dies are now employed by a St. Louis firm in cutting wood into toys, and the like, instead of fashioning the playthings with saws, as has been the common practice. These dies will cut material up to ¾ in. thick, whether it is plain wood or made of layers glued together. To make one of these cutting tools, the desired outline is cut in a block and then a steel knife with its edge projecting beyond the block is made to conform to the outline, after which a porous-rubber cushion is fitted over the whole die, so that it incases the knife, and is glued in place. The tool is locked in a chase and attached to a press in the usual manner. When the press is started the rubber cushion strikes the wood first, and is compressed until the knife finally cuts down into the material. The rubber, while under compression, helps to prevent the splitting of the wood, and by pressing against the sides of the knife keeps it rigid, even though it may be a very thin blade. When the die is withdrawn the rubber expels the freshly made blank automatically. With some kinds of wood it is necessary to finish the edges of the blanks, while other material is given a satisfactory edge by the die.

¶The War Department has let contracts for $5,500,000 worth of Vickers machine guns and accessories, and expects to spend $4,000,000 more for similar equipment. Apparently the much-discussed Lewis guns are not in favor.

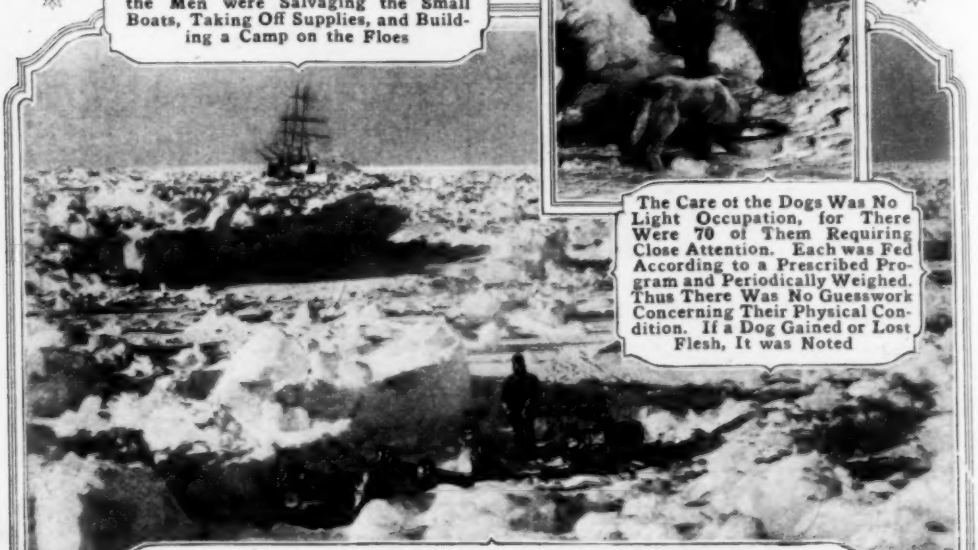
PICTORIAL STORY OF SHACKLETON EXPEDITION

Caught in the Resistless Grip of Two Enormous Floes, the "Endurance," Its Hull Crushed and Masts Sheared Off, Gradually Slipping from View into the Frigid Waters of Weddell Sea, Leaving Sir Ernest Shackleton and His Plucky Party of Antarctic Explorers on a Shifting Ice Pack in a Region of Perpetual Winter: From the Middle of January to the Last Day of November, 1915, the Vessel was Locked in the Ice. Time and Again It was Squeezed Up Out of the Water, Only to Drop Back, as the Pressure was Relieved, into the Jaws of the Eternal Vise That Ultimately Crushed It. The Photograph, One of the Rarest and Most Gripping of the Kind Ever Taken, Illustrates the Turning Point in an Absorbing Adventure. The Dogs Looked On Wonderingly as the Splintered Timbers and Tangled, Frozen Rigging of the Ship Creaked, Groaned, and Then Disappeared. The Men Faced Drifting Ice Fields and a Sea in Which Floated Menacing Mountains of Crystal White

PHOTOS BY FRANK HURLEY; COPYRIGHT, UNDERWOOD & UNDERWOOD

Feeding the Dogs before Their Snow Kennels alongside the Ice-Locked "Endurance." The Picture was Taken in the Midst of the Long Polar Night When for 92 Days the Sun was Hidden below the Horizon. At the Time, the Ship Was Still Intact and All Was Ready to Take the Dogs Aboard the Moment There Were Signs of the Ice Breaking. It Was Not Long, However, Until the Vessel was being Ground to Pieces and the Men were Salvaging the Small Boats, Taking Off Supplies, and Building a Camp on the Floes

The Care of the Dogs Was No Light Occupation, for There Were 70 of Them Requiring Close Attention. Each was Fed According to a Prescribed Program and Periodically Weighed. Thus There Was No Guesswork Concerning Their Physical Condition. If a Dog Gained or Lost Flesh, It was Noted



Miles upon Miles of Snow-Covered Ice and, Fast in the Middle of It, the "Endurance." During the Months That the Drifting Pack Carried the Party Northward, an Enormous Mountain of Ice Doggedly Followed Along, Threatening Time and Again to Batter through the Floes. After Finally Reaching Elephant Island, Shackleton Picked the Six Hardiest of the Men to Accompany Him on His Daring Dash of 750 Miles in an Open Boat to South Georgia—and Help. For More than Two Weeks the Men Battled the Sea in Clothes Soaking Wet

PHOTOS BY FRANK HURLEY; COPYRIGHT BY UNDERWOOD & UNDERWOOD

The "Endurance" Became Uninhabitable a Month Before It Finally Sank. So in October the Party Established Its Camp on the Ice alongside the Ill-Fated Vessel. When the Latter Finally Disappeared an Attempt to Proceed Northward Met with Failure, and Ocean Camp, Where the Castaways Remained until Three Days after Christmas, was Founded a Few Miles from the Ship's Grave. When Travel toward the North Again Seemed Possible, Dogs and Men Struggled across Rugged Ridges and Hummocks for Five Days. Unsound Ice Made Them Halt at a Point That Became Patience Camp. Pictured Above Is Ocean Camp, and at the Extreme Left Sir Ernest Shackleton

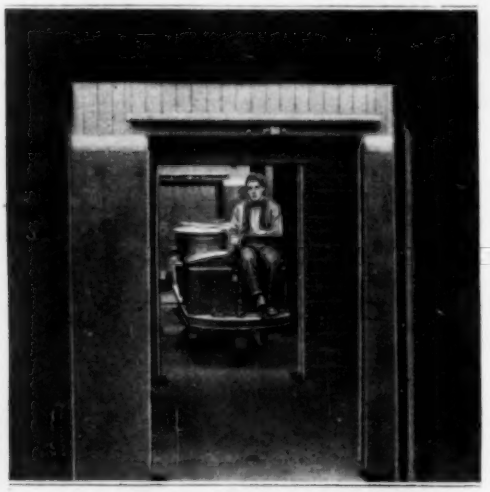
Before Their Tents at Patience Camp, Sir Ernest, and at the Left, Frank Hurley, Photographer of the Expedition. Here the Men Stayed until April, While the Drifting Pack Carried Them Northward. When Clarence Island was Sighted It was Decided to Stake All and Put Out in Open Boats for Elephant Island, Which was Reached after Two Days of Hardship

From Out of Another World, a Skiff! Sir Ernest Shackleton, after Three Disheartening Failures, Coming across the Water to the Dancing, Jubilant Fellows He Left at Elephant Island Four Months Before. The Party had been Assembling Following the Call of "Lunch O," When the Cry, "Ship O," Caused All Hands to Forget the Soup of Seal's Backbone and Seaweed. Signal Fires were Started When the "Yelcho," the Chilean Government Steamer, Hidden from View Here, Appeared to be Passing Them By. Observe That the Overwhelming Joy of Approaching Succor did Not Cause the Photographer to Miss One of the Best Pictures of the Adventure

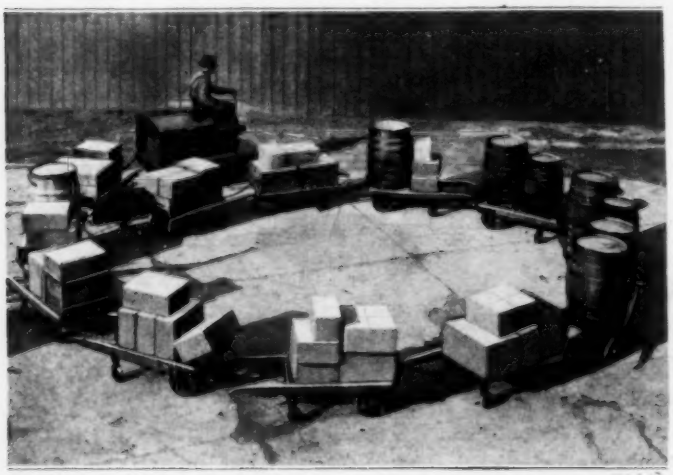
PHOTOS BY FRANK HURLEY; COPYRIGHT, UNDERWOOD & UNDERWOOD

EFFICIENT POWER UNIT DRAWS HAND TRUCKS

One of the efficient types of power units which is being used in large industrial plants and in railway freight stations in connection with loading and unloading materials, is shown in the accompanying illustrations. The tractor is electrically driven and is employed in the same manner as a switch engine. That is, it draws its load to the proper destination, and while the train is being unloaded it is employed in making other hauls. One of the simplest and most satisfactory forms of trucks used with this type of tractor is made by equipping an ordinary hand truck with casters and a patent hitching, or coupling, device. The latter is so constructed that it makes each truck follow almost exactly in the path of the truck ahead of it. This feature is of special importance in large factories and on freight platforms where the little trains often have to wind their way along narrow circuitous passages.



Tractor Drawing Hand Trucks through Freight Cars Placed Side by Side and Suitably Connected to Form a Passageway from a Loaded Car to a Platform



A Train Composed of Hand Trucks Equipped with Casters and Coupling Devices Which Make Each Unit Follow in the Track of the One Ahead

NEW TYPE OF BANK DRIVES OUT "LOAN SHARKS"

By competing with "loan sharks" in the field where they make their greatest profit, namely among unpropertied wage earners who must borrow to meet emergencies, money-lending institutions of a new type are now driving out usurers in New York and elsewhere. These banks enable one whose chief asset is his good character and modest earning power to borrow money at a rate considerably less than loan sharks charge. The New York bank of this type, opened only two years ago, made over 7,000 loans the first year, averaging $116 each. Chicago capitalists are considering starting a similar institution. An illustration will explain the methods employed. If a person wishes to borrow, say, $100, an application is filed attesting to the signer's good character and earning power. He must also get two persons to sign his note. The $100 is then given him, minus $6 interest deducted in advance, and a fee of $2 for investigating his case. He also must purchase savings certificates at the rate of $2 per week for 50 weeks, at the end of which time he may use

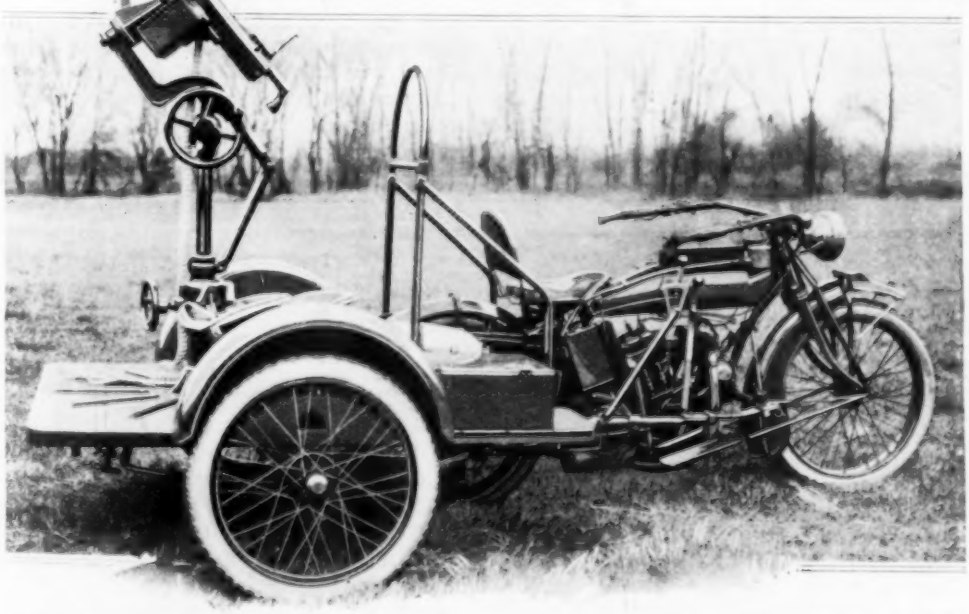
them, if he desires, to pay his note. Experience shows that 30 per cent of the borrowers continue their savings accounts after paying off their loans.

MACHINE-GUN CARRIER FOR MOTORCYCLES

A new type of machine-gun carrier, which can be quickly attached to or detached from any standard make of motorcycle, was inspected recently by foreign representatives at the testing field of an eastern firearms company. It consists of a low platform of hard wood, carried on a pair of bicycle wheels and recessed in front to receive the rear wheel of the motorcycle, which is left free to ride up and down over road obstructions. The only connection is at the front of the motorcycle. The gun mounting on the platform is so constructed that a complete circle may be described in operating the machine gun, whether shooting horizontally or in the position required for antiaircraft work.

ELECTRIC SIGN WORN ON BACK OF THEATER USHER

By way of experiment the ushers of a Boston theater have been provided with a new electrical device which aids in showing playgoers to their seats. It consists of a small electric sign which is suspended at the usher's back by means of straps over the shoulders. When the wearer presses a button which is connected with the sign the words "This Way, Please" are illuminated. They serve both to attract the attention of the patrons to the usher who is to wait on them, and to light up the aisle when the theater is in semidarkness.



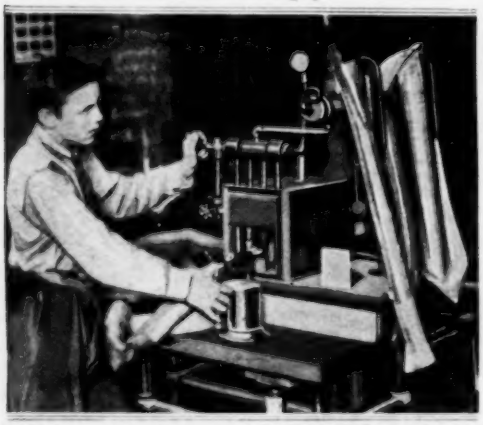
With This New Gun Carrier for Motorcycles the Machine Gun may be Used in Ground Battles, Elevated as in the Picture, or Depressed for Downward Shooting, and Swung around an Entire Circle if Necessary. The Outfit can be Operated by Two Men and Both Car and Gun Are Quickly Detachable

COPYRIGHT, INTERNATIONAL FILM SERVICE

At the Crucial Moment a Glass was Blown from the Pilot's Goggles, Blurring His Vision and Causing the Wreck

TIRE VULCANIZING TAUGHT IN PUBLIC SCHOOLS

Some of the pupils enrolled in the vocational-training classes of the Cincinnati public schools are being taught to repair the tires of their fathers' motor cars. Not long ago an automobile concern loaned some of its equipment to the schools with the result that a thorough course in tire vulcanizing and repair has been established. The work, as one might well imagine, appeals to a large percentage of the boys and therefore the course is a popular one. Parents and teachers are taking advantage of the opportunity to have tires mended cheaply.



It doesn't Take a Young Chap Like This One Long to Master the Vulcanizing Machine

ACCIDENT AND THEN RECORD MARK AIRMAN'S FLIGHT

In landing at the Philadelphia Navy Yard, on League Island, H. W. Blakely —one of the 12 army aero-reserve pilots who recently made the 115-mile test flight from Hempstead Plains, N. Y., to the aforementioned point and return —met with a queer accident. As he was nearing the ground a lens was blown out of his goggles, causing him to strike a flagpole. The machine dropped and turned up on its nose, after encountering a ditch. The pilot, and the passenger he carried, escaped injury, while the craft merely suffered a broken wheel. On the return trip the airman lowered the record for flight between the two points by covering the distance in 72 minutes.

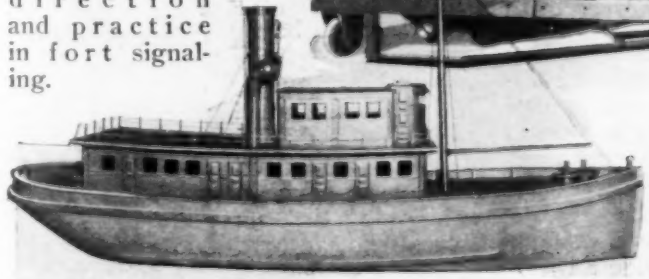
CRUMBLING OF BREAKWATER MAY BE DUE TO SALT

Not long after quantities of rock had been placed in a breakwater at Eureka, Calif., it was found that, on exposure to the salt water, some of the rock began to crumble. The material used was a coarse diorite, an igneous rock of crystalline texture, and apparently it was in excellent condition. However, a microscopic examination showed that the feldspar in the crumbling portions

was much decayed. This discovery gave rise to the theory that the alternate submersion and exposure of the ballast, due to the tides, left deposits of salt which entered crevices in the surface and dried. It is believed that tiny crystals formed in this way, by their expansion broke down the rock.

ELECTRIC HARBOR BOAT FOR ARTILLERY ARMORIES

An officer of the New York Coast Artillery has built a miniature electric harbor boat, to furnish a target which will move about on armory floors at a uniform rate of speed slow enough to give the coast-defense gunners good practice in sighting and ranging by means of "plotting boards." The hull and superstructure of the boat are built over, and conceal, a low steel chassis, or framework, which supports the operating and control mechanism, also the operator, who sits inside and steers the boat about the armory floor. Power is furnished by a storage battery of 10 cells, and the driving apparatus consists of a vehicle-type motor rated at 12 volts, 11 amperes, at 800 r.p.m. By means of a simple control lever, three variations of speed ahead and two variations astern can be had. The maximum speed of the apparatus represents, upon the scale of the armories and the plotting boards constructed for use therein, an actual speed of about 18 knots, or 20¾ miles an hour. It enables the artillerymen to have vessel-tracking drills, also drills in tug direction and practice in fort signaling.



This Miniature Boat is Self-Propelled by Electricity and Moves about an Armory Floor to Furnish a Target for Coast-Artillery Practice in Vessel Tracking: The Concealed Operator and Mechanism are Seen Above

MOTOR WHEEL FOR BICYCLES FITS ANY MACHINE

Any make or size of bicycle can be readily transformed into a motorcycle

An Ordinary Bicycle Converted into a Motorcycle by Substituting a Newly Invented Motor Wheel for the Original Rear Wheel

by changing the rear wheel for a new motor wheel invented by a New York man. This attachment includes a heavy 26-in. bicycle wheel, with a 2-hp. motor plant, and a substantial mudguard designed to fit into the forks of the bicycle after the original wheel is removed. The motor is of four-cycle type, and weighs only 57 lb. It is claimed that it will make about 100 miles to the gallon of gasoline, will climb the steepest grades, and enable the rider to keep up with fast-moving traffic, while none of the extra weight or vibration falls on the bicycle itself, all being carried by the specially constructed wheel. The motor is

carried on the left side of the wheel, the crank shaft extends through the hub, and a flywheel on the right side incorporates a built-in magneto.

BARREL STRAWBERRY PATCH FOR CITY BACK YARD

A portion of an especially attractive "barrel strawberry patch" is shown in the accompanying illustration. This

One of Several "Strawberry Barrels" in a Los Angeles Back Yard: The Patch Occupies About One-Fifth the Space the Same Number of Vines would, Planted in the Ordinary Way

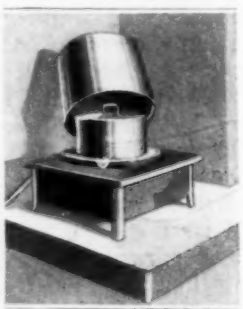
barrel is one of several owned by a Los Angeles man whose back yard was too small to admit of a regular strawberry bed. It was found that these unusual holders occupied about one-fifth as much space as an ordinary patch containing the same number of plants. To utilize a barrel in this manner, holes, about 12 in. apart, were bored in rows in its sides. Several tin cans, with perforated bottoms, were piled one on the other in the center of the barrel and enough dirt thrown about them to fill the receptacle up to the first row of holes. After the dirt had settled sufficiently, strawberry vines were planted in the holes and allowed to hang outside. This process was repeated until the barrel was full and vines had been set in all the holes and on the top. As the soil was added, cans were piled up through the center to provide an irrigation passageway. A hole was bored in the side near the bottom to allow surplus water to drain off.

SHAPE OF ENGLISH BULLET AFFECTS ALUMINUM MARKET

A peculiar circumstance in the manufacture of English rifle bullets is said to be responsible, in part at least, for the increased price of aluminum. Shortly after the outbreak of the war England gave up making round-nose bullets and produced, instead, a pointed variety with a solid-lead point inclosed in a cupro-nickel jacket. Some time later it was discovered that these missiles were not properly balanced for the English type of gun. After many tests the difficulty was overcome by inserting a little aluminum cone, ⅜ in. high, in the apex of the cartridge jacket. While the weight of a single cone is, of course, almost negligible the total amount of aluminum required for England's rifle ammunition runs into thousands of pounds. It is this unusual demand that is said to have affected the price of aluminum.

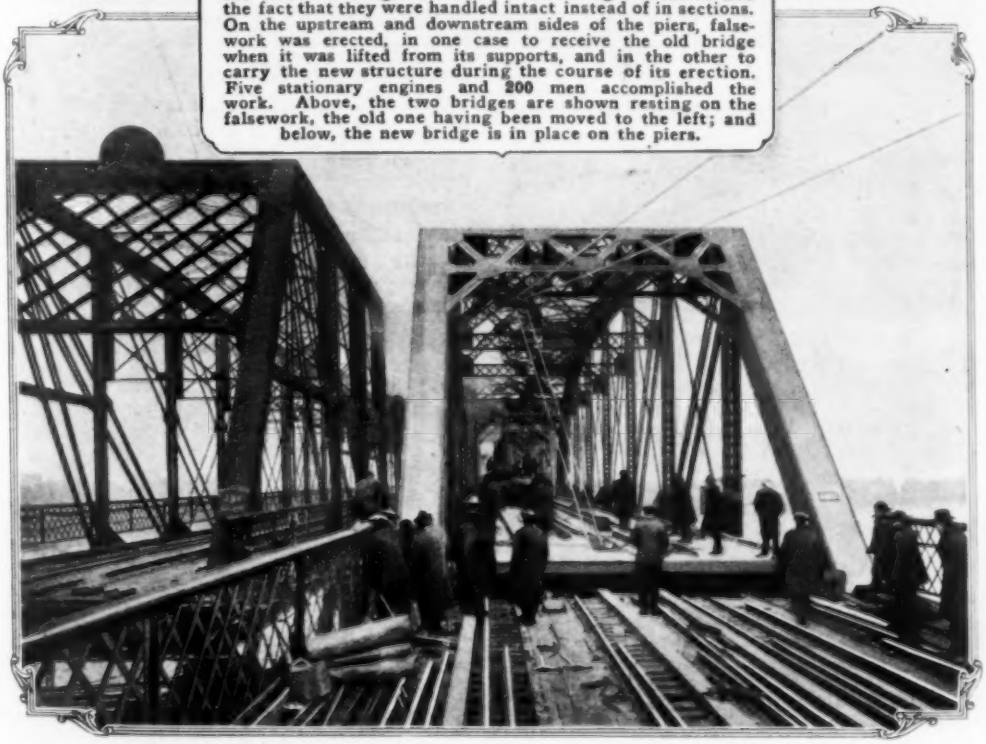
SIMPLE FIRELESS COOKER USED IN GERMANY

A fireless cooker of very simple design, which has recently been brought out in Germany, is shown in the accompanying illustration. It consists of an asbestos cylinder, closed at one end, and an asbestos disk large enough to cover the opening in the cylinder. The disk is placed between the gas, or oil, blaze and the dish in which the food is to be cooked, while the cylinder is used as a cover. After the food has boiled properly the fuel is turned off, but the cooking continues, for the asbestos allows the heat to escape very slowly. Since the device is such a poor conductor of heat it can also be used as a cooler, in which case the interior is lined with a damp cloth.



LARGE BRIDGES ARE SHIFTED QUICKLY

THERE is something more than passing interest to be gleaned from an engineering feat that has been executed at Omaha. A few weeks ago an old four-span, 1,000-ft., 2,750-ton railway bridge extending over the Missouri River and connecting the Nebraska and Iowa shores was replaced with a new one weighing 5,500 tons. The time actually spent in moving the original structure out of the way and slipping the other one onto the piers amounted to 15 minutes, while traffic was actually suspended for less than one hour. The operation is noteworthy because of the size and weight of each of the bridges involved and the fact that they were handled intact instead of in sections. On the upstream and downstream sides of the piers, falsework was erected, in one case to receive the old bridge when it was lifted from its supports, and in the other to carry the new structure during the course of its erection. Five stationary engines and 200 men accomplished the work. Above, the two bridges are shown resting on the falsework, the old one having been moved to the left; and below, the new bridge is in place on the piers.



CONVERTIBLE SHUTTERS SERVE AS AWNINGS

A combination window shutter and awning is being manufactured by a New York City company which permits freer ventilation than a cloth awning, is much more durable, and need not obstruct the view from within. This article differs from the ordinary shutter in that it has a small upper portion which is attached to the rest of the blind by hinges, and in one side of the lower section nest several wooden strips, ⅛ in. thick and 2 in. wide, that are held together by a bolt at their upper ends. To convert two of these shutters into an awning they are closed and locked together. After releasing certain catches the lower end is pushed out from the window. This causes two iron braces to drop down and hold the shutters in place, while the narrow wooden strips, nested in the frames, spread out like fans on either side of the window so that the latter is protected on both sides as well as in front. When the blinds are not used as awnings the bracing arms serve as hinges.

A View of Convertible Shutters, Showing the Wooden Strips Nested in the Frames, and Hinged Sections Above

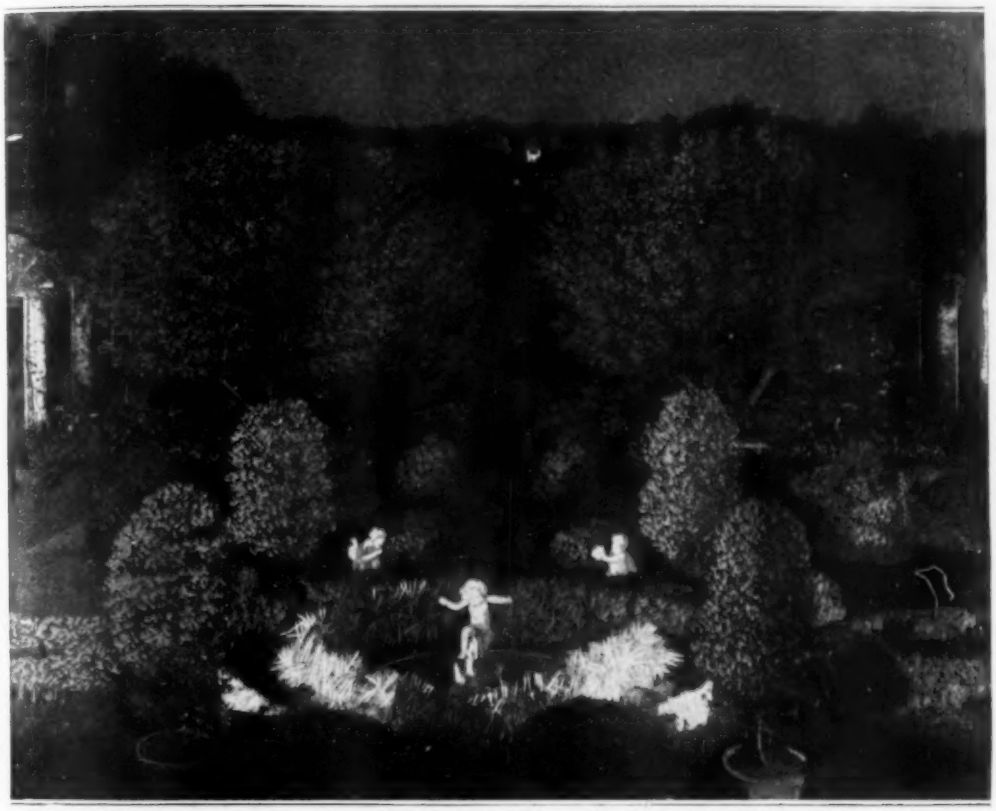
The Shutters Used as an Awning: The Thin Wooden Strips Form Protecting Fans at Either Side

MUNICIPAL BATHING BEACH FLOODED FOR SKATING

A popular municipal bathing beach in Chicago was flooded to form an ice rink for skaters this winter, being used for the first time on Christmas Day, when a small preliminary crowd of about 2,000 persons appeared on the ice. The space prepared for skating measured about 300 by 400 ft. The beach was first sprayed over on a cold day with water, which froze quickly and formed a holding surface on the sand. This was then flooded with 1½ in. of water and a satisfactory skating surface of ice resulted, to the delight of residents of the neighborhood. Last summer the beach, with its splendid facilities for bathing, represented the acme of comfort to Chicagoans, and crowds of 50,000 a day were frequent during the heated term.

Scene at Clarendon Municipal Beach Last Summer, When Thousands Daily Disported in the Waters of Lake Michigan

Skating on the Sands of Clarendon Beach, Chicago, This Winter: This Is the Largest Municipal Bathing Beach in the City and was Successfully Transformed into a Winter Resort



COPYRIGHT, PACH PHOTO NEWS, INC.

ARTIFICIAL MOONLIGHT FOR ITALIAN GARDEN

THIS view of a very beautiful and extensive Italian garden on Long Island gives some conception of the unusual lighting system which has been devised by the owner for the purpose of producing the effect of moonlight. Much study and experimenting resulted in installing electric lights having an aggregate of 500,000 cp., at various points in the garden. They are concealed behind shrubs and screens in so skillful a manner that the effect at night is quite suggestive of soft silvery moonlight. The lights make the statuary, fountains, and pergolas stand out in vivid contrast to the surrounding green foliage. The garden, through the center of which runs a beautiful shaded walk, is more than half a mile long.

ATLANTIC-TO-GULF CANAL FOR FLORIDA PROPOSED

Agitation in various parts of Florida has aroused interest in a proposed system of canals which would provide an inland waterway through the heart of that state from the Atlantic to the Gulf of Mexico. It is hoped that the active support of some 15 counties can be obtained, and that the state legislature will pass a law creating a canal district with full power to carry the work forward. One of the proposed routes would utilize St. John's River to a point well up toward its source, and, in the opinion of its advocates, would possess enough strategic value to warrant the giving of Federal aid. One of the contemplated routes to the west coast is via Lake Okeechobee and Caloosahatchee River. It is contended, also, that a canal district should be considered in the same light as a road district, and that if the Federal government is to aid good roads it should also assist in canal digging.

¶Separate curtains for upper and lower berths are a welcome feature of the sleeping cars on an eastern line's new Chicago-New York trains.

ICE SKATING ON THE ROOF OF A HOTEL

A novel sensation was furnished for the guests of a New York hotel this winter, when an ice-skating "pond" was opened on the roof. The ice was in good condition on December 30, the opening day, and many people enjoyed the healthful and exhilarating sport, with added zest due to the fact that they were skating in the very center of the metropolis, far above the heads of the busy throngs in the streets below. The roof rink became popular immediately.

COPYRIGHT, INTERNATIONAL FILM SERVICE

This Ice Rink on the Roof of a New York Hotel Was a Novelty Provided for Guests This Winter and They Evidently Enjoyed the Sport

---

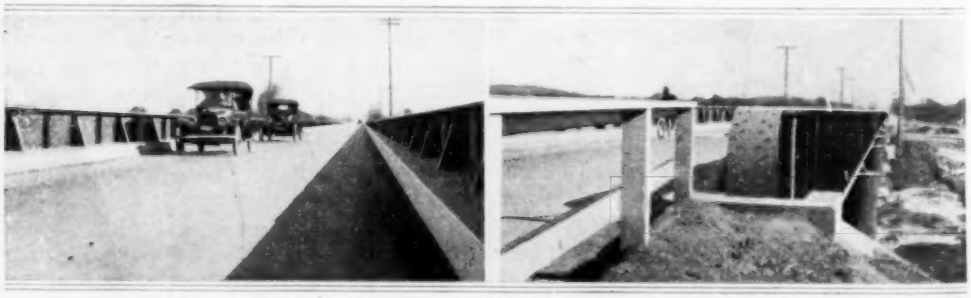
¶It is said that aviation in America will be seriously handicapped if two leading aeroplane companies insist on the heavy royalties they are now demanding of smaller manufacturers.

NEW LIGHT ON FORMATION OF COAL

A minute examination of coal has recently given rise to an interesting theory as to how that fuel was formed. Means have been devised for slicing it into sections so thin that they are almost transparent and can be studied to excellent advantage with a microscope. The use of this instrument revealed but little cellular structure in the coal, and where fragments of plants existed, they seemed to merge directly into the noncellular mass. As a result of the study in the course of which these facts were brought out, the belief has arisen that in the formation of coal vegetable matter was first entirely decomposed, by bacterial action, into a liquid and then other vegetation, not decomposed, became saturated with this liquid and eventually was changed into fuel.

MOTOR-CAR BRIDGE BUILT ON NEW SAFETY PLAN

Safety first has been the guiding principle in the construction of a new bridge which carries an automobile highway over an arroyo, or former river bed, near El Monte, Calif. The bridge has been specially designed for the pre-



Left: Note the Wide Curb That Prevents Cars from Running Too Close to the Heavy Railings. At the Right are Shown the Steel Girders of the Bridge Extended above the Floor Level to Form the Side Railings

vention of motor-car accidents. Its heavy side girders are extended upward, above the floor level of the bridge, to form the side railings; and in order to prevent motor cars from injury, by "hubbing" the railings or their massive supports, a wide concrete curb is built along the inside of the bridge on both sides of the road. It is said that this type of bridge has the additional advantage of costing less than ordinary types of steel-bridge construction, so that it safeguards the local taxpayer as well as the motorist.

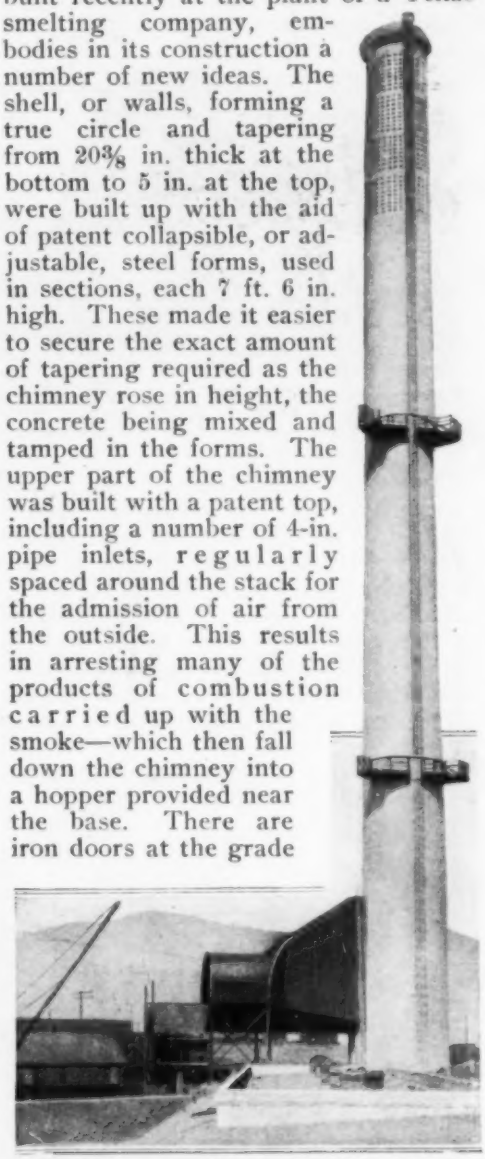
CHICAGO MAY USE WASTE TO MAKE BIG PARK AREA

Until the practical basis for the statement is understood, it sounds truly incredible to declare that, if Chicago so desires, within a few years it can have without cost 1,300 acres of newly made park lands, valued at $46,000,000. This can all be brought about by utilizing the city's waste, composed of excavated earth, street sweepings, etc., in constructing a strip of land along the lake front. The city's annual waste product is estimated at over 3,000,000 cu. yd., of which about one-half is from private contractors, who, it is believed, would pay a fee for the privilege of dumping their excavations, etc., close to shore. The whole scheme has been worked out by the Chicago Plan Commission, and since the city already has many acres of park area made in a similar manner, the project is receiving favorable consideration. To carry out the work, the city would have to build proper retaining walls, which, it is believed, subsequent revenues would pay for. Bathing beaches and drives would be featured in the new park land.

¶In the United States only one farm in seven, of over 20 acres, now supports sheep, and consequently we import nearly a third of a billion pounds of wool yearly. If one-fourth of the remaining farms would raise one sheep for each three acres, this big importation could be wiped out by home production.

CONCRETE CHIMNEY STACK WITH NEW FEATURES

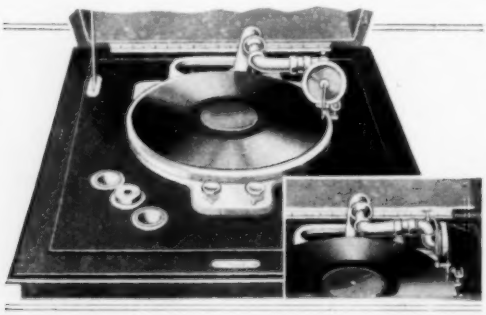
A concrete chimney, 300 ft. high, built recently at the plant of a Texas smelting company, embodies in its construction a number of new ideas. The shell, or walls, forming a true circle and tapering from 20⅜ in. thick at the bottom to 5 in. at the top, were built up with the aid of patent collapsible, or adjustable, steel forms, used in sections, each 7 ft. 6 in. high. These made it easier to secure the exact amount of tapering required as the chimney rose in height, the concrete being mixed and tamped in the forms. The upper part of the chimney was built with a patent top, including a number of 4-in. pipe inlets, regularly spaced around the stack for the admission of air from the outside. This results in arresting many of the products of combustion carried up with the smoke—which then fall down the chimney into a hopper provided near the base. There are iron doors at the grade level, through which a railway track runs under the hopper, so that a truck can be run in to remove its contents.



This Chimney Rises 300 Feet into the Air at a Texas Smelter, and was Built of Concrete with Adjustable Steel Forms. The Platforms Seen Part Way Up Furnish Means for Testing the Inside Temperature and the Volume of Smoke

PHONOGRAPH WHICH PLAYS ALL MAKES OF RECORDS

A phonograph has recently been placed on the market which is equipped with a reproducer so constructed that



A Phonograph Having a Reproducer so Constructed That It can be Set at the Angles Required for Either Vertical-Cut or Lateral-Cut Records

a record of any make can be played without using an attachment. Generally speaking, the grooves on a phonograph disk are made in one of two ways: by lateral vibrations of the sound needle, or by vertical vibrations. One type requires that the reproducer shall be placed at a certain angle, while with the other kind of groove it must be set at an entirely different angle. This reproducer is so hinged to the tone arm that the needle, or jeweled point, can be set in either of these positions. For one kind of record it can be provided with a fiber or steel needle, while if a record is to be played which requires a diamond point or sapphire ball, either of these can be substituted for the needle.

CITY TURNS COAL DEALER BECAUSE OF FUEL FAMINE

The coal shortage, which in recent weeks has threatened to bring about very serious conditions in many parts of the country, has stimulated agitation for municipal coal mines that would supply the schools and the departments of the local governments with fuel, and, in some cases, would sell to individuals as well. This proposal has already been adopted in Terre Haute, Ind., and a mine four miles from the city has been leased from which coal is sold for $2.75 per ton. An alderman in Detroit has advocated that that city buy or lease a mine, contending that by so doing the city could save $3 a ton on its fuel. A similar plan has been proposed in Cleveland. The undertaking is regarded as most feasible for municipalities in or near coal-bearing regions.

Teams Employed in Hauling Coal from Terre Haute's Municipal Coal Mine: The Fuel is Sold to Individuals for $2.75 per Ton

PAGEANTRY, A CIVIC PASTIME

By HENRY B. RONEY, *Pageant Director*

THERE probably is no more wholesome or educational festivity in which whole communities can participate, than pageantry. Based, as these performances are, upon local history, they become a most effectual method of passing stories of valor and glory, in all their wealth of detail, down the ages. In this country many states are now rounding out their first hundred years of history, as such. Centennial celebrations are an old story in the East, but the Middle West is only beginning to count the cycles of its past. This year Mississippi checks off her first century; next year is Illinois' turn; in 1919, Alabama will celebrate; in 1920, Maine; in 1921, Missouri. Last year, all the country rejoiced with Indiana. One of the most notable celebrations of that state is described in the accompanying article, written by the man who directed the performance. Anyone reading the account of the South Bend pageant can grasp the first principles of adapting such an entertainment to his own local conditions—history, talent, and facilities. He can understand how to go about it and how to carry it out. As Mr. Roney hints, pageants should not savor of commercialism. They are based upon a glorious past which is properly the heritage of every citizen. Their purpose is to promote community spirit and patriotism, and, as suggested in the beginning, to transmit the rich traditions of a vigorous people.—Editor.

Henry B. Roney

WHAT is a pageant? Most people have an idea that it is "some kind of a show," and let it go at that. Broadly speaking, there are but two general forms of pageants. One is a procession of horses, riders, floats, tableaux, vehicles, and footmen, appropriately decorated and costumed, representing incidents, stories, and characters in history, fiction, or allegory. The other is a community drama, enacted in the open by dialogue, pantomime, or both, depicting chronologically actual events in the history of a city or locality, or the story of incidents or characters in mythology, tradition, or fiction, with or without allegory and symbolism, with a great number of participants drawn from the community. And there are, of course, many variants of these two main classifications. It is with the community pageant this article will deal.

Modern pageantry is a growth. Its germ origin dates back five centuries to the semireligious, semisuperstitious miracle and mystery plays on "pageant stages" in the public squares of Old England, a function confined largely to tradesmen. Through the years the idea broadened into the passion plays of Selzach in Switzerland and Oberammergau in Bavaria, religious festivals based on the life and passion of Jesus Christ.

The Oberammergau festivals continue with unflagging solemnity every decade, but the community-pageant idea became more and more secularized with the passing years until it burst forth in full flower in Sherburne, England, in 1905. Others followed at Warwick, in 1906, and Bury St. Edmunds, in 1907. The latter had 2,000 persons in the cast and a general committee of 450, and it took 600 ladies many weeks of hard work to make the elaborate costumes. These pageants were based on local history running back to the time of Caesar. Thus modern spectacular pageantry as we know it began in 1905 and is less than 12 years old.

In 1908 the pageant germ crossed the Atlantic and took root in Philadelphia, where was held what was claimed to be the first pageant given in the United States, celebrating the 225th anniversary of the founding of the city. The same year Quebec celebrated the 300th anniversary of the founding of the city with a gorgeous pageant lasting several days, enlisting citizenry and military in large numbers. Probably 250 real pageants have been given in this country.

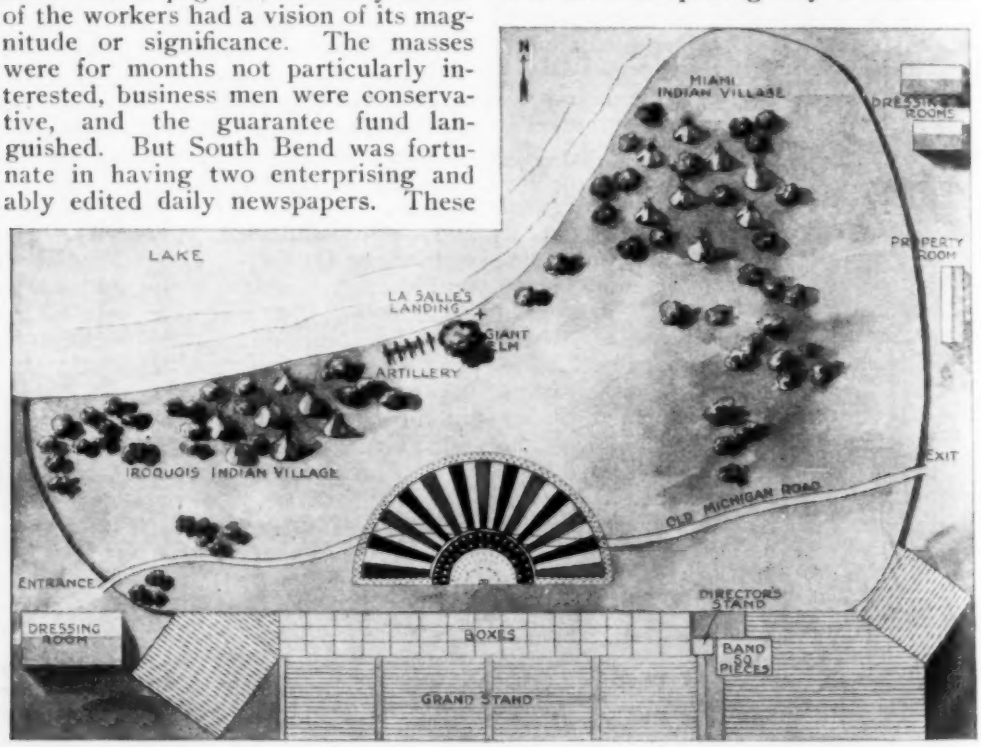
The year 1914 witnessed at St. Louis the climax of American pageantry in vastness of numbers of performers and audience—7,500 actors on a stage area nearly 1,000 feet long and 200 feet deep, performing before an audience of 60,000 people at Forest Park. A guarantee fund of $125,000 was raised for this the greatest drama ever staged, and which will long stand as the record. Pageants are usually more successful in the medium-sized towns where every interest is enlisted. St. Louis furnishes one of the rare in-

stances of civic unity in a city of the first rank.

In 1916, Indiana celebrated her centennial of statehood at each of her 92 county seats, headed by a county chairman appointed by the governor. Some were modest exercises in schoolhouses, churches, and groves; others were pretentious pageants enlisting hundreds of participants. Local and state history was the dominant theme, and this had long been the subject for study by the 564,252 children in the schools.

The South Bend centennial pageant was in preparation nearly a year. The pageant-writing committee of eight or ten began delving into St. Joseph County history in November, 1915. It entered upon executive work the following April, and the pageant was the first week in October. It was financed by guarantee subscriptions underwritten and accepted at the banks. It was at first slow work. South Bend had never had a pageant, and only a few of the workers had a vision of its magnitude or significance. The masses were for months not particularly interested, business men were conservative, and the guarantee fund languished. But South Bend was fortunate in having two enterprising and ably edited daily newspapers. These contributed uncounted columns of publicity with lavish disregard of free space, while the board of directors and the committees kept hammering away, appealing to civic pride and enlightening the people. Indifference finally gave way to interest.

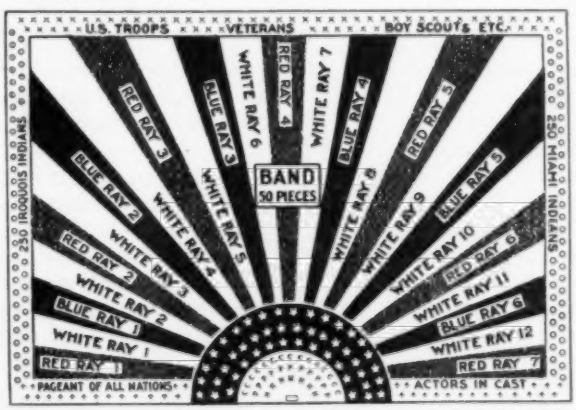
Important contracts and other work then had to be put through at white heat to be ready for the opening performance. One glance at the race-track ellipse at Springbrook Park, where the pageant was held, was enough to discourage the veriest optimist. The area of the "stage" for the reënacting of the historical scenes was about 1,000 feet long by 500 feet deep, equal to two large city blocks. One-third of it was low marshy ground. The wide race track was as smooth as a ballroom floor. The rest was rubbish-littered, bare ground denuded of every living bush and tree save one noble elm to redeem the landscape. But the enterprising city of automo-



Plan View of the Race-Track Ellipse and a Marsh as Transformed by the City of South Bend into a Suitable Setting for the Centennial Pageant. The Historical Episodes were Enacted at the Point Where the Sunburst is Shown

These Native Indians Are a Few of Those Who Came from the Government Agency in South Dakota to Help Make the South Bend Pageant a Success. Chief Black Hawk, an Hereditary Chief of Fine Character, Is the Central Figure in the Rear Row

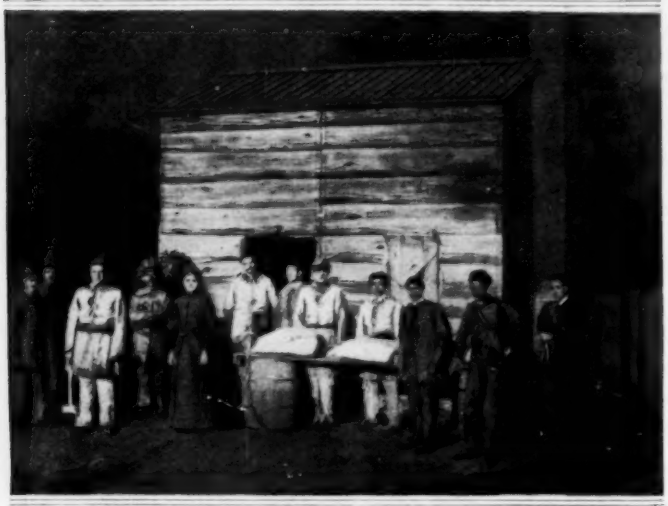
biles, chilled plows, agricultural implements, underwear and woolen mills, sewing machines, watch factories, and a hundred other big industries, stops at nothing when once aroused, and a week later the eve of the pageant opening saw a transformation that rivaled Aladdin's palace. Fences had been removed, grounds cleared and graded, and a dense forest set out, with an eye to forming good entrances, exits, screens, and backgrounds for the dramatic work. In the place of the marsh was a beautiful lake made by pumping in water from the St. Joseph River, 15 feet below, by a centrifugal pump throwing 800 gallons a minute. A boat landing was dredged and on this pretty sheet of water the moonlight reflections of many tepees and camp fires through the trees added a realistic touch to the landscape, while Indian canoes, darting hither and thither, made the illusion complete. After the South Benders awoke and warmed up to the work, the question of "clearing expenses" went to the background. The only thought was to produce a superb performance on a colossal scale regardless of cost. And they did it.



Sunburst Formed by the Chorus: The Red and White Rays were Formed by Children Wearing Robes of Those Colors; Blue-Robed Persons Formed the Field of the Half Sun, 48 of Them Carrying White Star-Shaped Umbrellas; in Front, at the Center, Were Grouped the Principals of the Cast

The permanent concrete grand stand was enlarged to a capacity of 13,000 persons. Nearly every pageant I have witnessed had one great weakness—too much dialogue impossible for the multitude to hear, especially if the wind was blowing. When most of the actors are

unaccustomed to public speaking, as is usually the case, the inability to understand always stimulates talking and confusion. When pageant books are not furnished free, one-half of the audience will be without them and thus unable to follow the story. The pageant committee wisely decided to have the drama almost wholly in pantomime.



The School Children of South Bend and Vicinity had Read in Their Histories All About the Trading Posts of Pioneer Days, but Since the Great Pageant They Understand Just How Such Posts were Conducted and the Perils Besetting the Men of Old Who Patronized Them

Pageant week opened with commemorative services in all the churches, and a union of choirs in a sacred concert in the afternoon at the park. The pageant book was an octavo containing the county's condensed history, and the scenario, divided into 24 episodes running vis-à-vis, and all of the choral music of the pageant. It sold at the trifling sum of 10 cents. Not an advertisement was permitted in the book. Show and street-fair methods were taboo. My plans for the pageant included:

1. A band of real Sioux Indians from the government agency in South Dakota, in native dress under command of Chief Black Hawk, to give war dances, take part in the peace council and lead in the big fight, for no true history can go back very far and get away from the Indian.

2. A chorus of 5,000 or more singers, largely children, to contrast the privations and meager educational privileges of pioneer days with the splendid cultural advantages afforded by the modern "School City of South Bend," as it rightly calls itself, and to thrill the multitude with an outburst of song in the patriotic finale, the only adequate climax to the great scheme.

3. Five cannon from Culver Military Academy, to be fired by electricity in the massed choral effects, and a company of cadets and officer to handle them.

4. A telephone system with ten offices and operators, at dressing rooms, entrances, exits, Indian villages, boat landing, artillery and electric-light chief's stations, with switchboard at the director's station. Some of the dressing quarters and property rooms were nearly a quarter of a mile apart.

5. A great military band of highest rank, of 50 instruments, rich in reeds, wood winds, tympani, and cathedral chimes, to give day concerts, accompany the big chorus, and to illustrate the scenes with interpretative music—pathetic, stirring, tragical, martial, humorous—furnishing local color according to the story, subconsciously playing upon the emotions of the people and increasing the dramatic effect.

6. An electric baton of original design, hereafter described.

The board of directors approved and authorized every recommendation. Every feature "made good" and justified the large expenditure. It was not a commercial pageant. Some splendid industrial parades were features of the three-days' centennial celebration, but they were uptown and not of the pageant proper. The electric lighting was the most costly and elaborate yet attempted in pageantry. A long bridge

Father Marquette Passes on His Last Journey: The Great Missionary to the Indians Was but 38 Years Old at This Time. He Died Shortly after His Passage through St. Joseph County, Indiana. This Sad Episode (1675) was Most Effectively Staged

built on top of the grand stand was filled with searchlights and spot lights, handled by a dozen electricians. Thousands of straw-colored footlights threw a soft amber glow over the enormous stage area, and arc, colored, and bunch lights wherever needed completed the dazzling scheme. The installation of the special lighting cost nearly $2,000; the band a like amount.

For the patriotic finale the original idea of a living sunburst in national colors was adopted. Five thousand children were to form the radiating "rays," and hundreds of adult singers the "sun." The children were seated on bleachers at either end of the grand stand with their teachers, all previously assigned to certain numbered red, white, or blue rays, according to a diagram given to each singer. They were therefore able to see the entire performance up to the final episode. A telephone message to the artillery station on the shore of the lake sent three signal rockets piercing the sky, and started the singing hosts to their positions to form the rays for the sunburst. Here colored wraps were distributed to the columns to make the red-white-blue-white alternating rays. The stopping points for the head of the columns were indicated by small red, white, or blue electric transparencies, strung by cable on the ground, indicating the number of the ray of corresponding color. The adult singers, forming the blue field of the half sun, then flowed in from either side, and 48 ladies scattered through the blue raised as many white star-shaped umbrellas. The gorgeous eagle-feathered and beaded Indian chiefs formed a semicircular row inside of this; priests, missionaries and historical characters — La Salle, Joliet, Tonti, Marquette, etc.— followed, and the gigantic sunburst was complete, ready for the choral climax. There were 1,000 in the cast and over 6,000 persons were massed in the closing patriotic tableau.

The Electrical Baton, with Which a Great Chorus of 6,000 Persons was Successfully Conducted

Cannon were fired by the director while conducting the chorus, by closing a switch, the report coming in exact time on the accented beat of the climaxes at the end of "Old Glory" and "Star Spangled Banner." The effect, not unlike a tremendous bass drum, was startling.

The chorus was directed by an electric baton, a new invention of the director and used on this occasion for the first time. A baton with a tiny electric bulb on the end for conducting

orchestras in darkened theaters is not new, but to direct and hold together a chorus of 5,000 children at night in the open air, is a different proposition. The instrument is triangular, 3 ft. 4 in. long. On one side is a row of blue electric bulbs, on another a row of red, and on the third side a row of white, each giving a continuous shaft of light nearly three feet long. Thumb buttons changed the colors to indicate expression, blue signifying, "sing softly"; red, "sing medium power," and white, "full power." The baton, connected by cable to a five-volt storage battery underneath the director's stand, weighed a little less than three pounds, and was a perfect success. It could be easily seen at the farthest lines of the singing army, and it served the double purpose of arresting the attention of the children by the fascination of its flashing, changing colors.

The South Bend pageant condensed 240 years of intensely interesting local history into a three hours' performance. It lent itself wonderfully to dramatic presentation and had all the elements of a fascinating historical novel. All of the characters of the early priests and missionaries were taken by the faculty and student body of the great University of Notre Dame. Five hundred Indians from the Order of Red Men of Mishawaka and South Bend, led by a score of real Sioux warriors from South Dakota, staged a thrilling fight of 1676 between the Iroquois and Miamis, traditional enemies. Ladies from the auxiliary Order of Pocahontas dressed and painted as squaws, and the youngsters became Indian children. All other episodes were staged by local clubs, military, societies, schools, lodges, and individuals. Five make-up artists from the Chicago Grand Opera Company transformed the pale faces into the aborigines of the forest.

In the wealth of scene and story nothing gave a more powerful tugging at the heartstrings than the prologue which just preceded the great fight, "Father Marquette passes on his last journey, 1675." The intrepid missionary with the hand of Death upon him, was making his painful way through the wilderness, leaning heavily on a guide, with two companions following, carrying his canoe. They stop to rest, then pursue their slow journey to the landing, followed by the searchlights, while the band intoned the mournfully pathetic "Angelus" of Massenet. Marquette, then in his 38th year, died a few weeks later near St. Joseph, while trying to reach his headquarters at St. Ignace, Upper Michigan.

The landing of La Salle and his retinue, 1679, and their entrance was another splendid scene. A pathetic tragedy was "Jean Beaudoin's run, 1831," showing the young French hero finishing his thrilling run of 160 miles with a broken arm, passing through "the great (Kankakee) marsh" to warn the little village of South Bend of the uprising of Black Hawk and his threats of massacre. Exhausted, he falls in a faint, is revived, and breathes his message. His sweetheart, Poppy Eaton, who has been sent for, comes on horseback at a mad gallop, and he dies in her arms.

Another scene of mournful splendor was "The departure of the Pottawatomies, 1840," where, after the United States government had sold their lands, they were driven out to the Southwest by United States troops. Rounded up by the soldiers and led by Father Badin, with crucifix raised aloft, the whole tribe with bowed heads and broken hearts slowly took their departure in seemingly countless numbers. The gorgeousness of Indian costumes, from chiefs who led, to the squaws bringing up the rear, presented a scene of aboriginal tribal splendor never equaled in American pageantry. Under the wonderful effects of search and spotlights they disappeared in the far distance. Their camp fires which flickered on the great field of woods and shore died out, and we came back to earth again to realize that it was not fiction but a cruel injustice in our last century's history. And then, on down through the 19th century the episodes marched, showing the first settlements, the burning and rebuilding of Misha-

In This Day of Railroad Trains and Automobiles There Is Little to Remind Us of the Slower and More Picturesque Modes of Travel of 1850. South Bend's Most Illustrious Citizen, Schuyler Colfax, was Impersonated at the Pageant and Appeared in an Old-Time Coach. Colfax Was an Editor. He Served Many Terms in Congress and Was Vice-President under Grant. The Episode of His Return was Staged by a Lodge

Jean Beaudoin Was a Young Frenchman Who Heard of Chief Black Hawk's Plan to Raid the Frontier and Massacre All Whites, Including the Villagers of South Bend. Beaudoin Ran 160 Miles to Warn the Whites. His Arm was Broken en Route and He Died of Exhaustion with His Mission Just Accomplished. His Sweetheart, Poppy Eaton, Heard the News and Came Madly on Horseback, Reaching Her Lover's Side Just as He Expired. This Episode (1831) was Presented by the Notre Dame University, Red Men, Canoe Club, and Woman's Civic League

After Father Jacques Marquette, the Next White Man to Visit the St. Joseph Valley Was La Salle. He Followed the Great Lakes, Coming down Lake Michigan and Turning up the St. Joseph River. With Him Were About 30 Priests, Carpenters, and an Indian Guide. Snow was Falling and They Missed the Portage, the Indian Guide, White Beaver, Being Away Hunting. La Salle Landed and Walked Nearly to Osceola, Looking for the Portage. Staged by Notre Dame University, South Bend Canoe Club, and Red Men

waka, the growth and development of the two cities, with a wealth of local incidents and celebrities, bringing the story down to the present.

One of the most significant features in the South Bend celebration, in addition to the folk dances of all nations at the daily band concert on the courthouse plaza, was the pageant of nations. In this 15 nationalities participated — French, English, Irish, Dutch, Belgians, Scotch, colored, Danish, Italians, Russians, Swedes, Germans, Filipinos, Hungarians, and Polish. While the band played their national airs in turn, they marched by Miss Columbia, guarded by the Army and Navy, deposited their native country's flag, took up the Stars and Stripes and marched on singing "My Country, 'tis of Thee." It was a polyglot transformation sermon that thrilled.

No large pageant can be put on in a hurry. The details are endless. A year may be required for research, collecting historical data, and writing the scenario—fascinating work, every hour of it. The pageant text is best written in collaboration, as at Oxford and at the University of North Dakota, where different groups of undergraduates each wrote one of the parts. No pageant ever was "perfect." There were hitches at South Bend due to newness and inexperience, but none probably, except the principals, discovered them in that stupendous, colorful, moving panorama of history.

MOTOR-DRIVEN PUMP FOR FLOODED MANHOLES

When the manholes of the electric-light system in Rochester, N. Y., are flooded, as often happens in the spring and after heavy rains, a motor-driven pump, carried on one of the light company's electric trucks, is used to remove the water. The apparatus consists of a ¼-hp. vertical motor and a small centrifugal pump, connected by a 3-in. spiral riveted pipe 7 ft. long. The pipe acts as a support for the motor, and its length permits the pump to be lowered into the water without submerging the motor, while it also conducts the flood water in the manhole from the pump to the street level. The shaft of the motor and the impeller of the pump are connected by a ⅝-in. brass rod running through the 3-in. pipe. The electric truck furnishes power from its battery and carries a small crane, by which the pump can be swung over the manhole and lowered into it by means of a block and tackle.

Pump in Position to be Lowered into a Flooded Manhole: An Electric Motor at the Top of the Upright Pipe Runs the Small Pump at the Bottom

PORTABLE DISINFECTORS FOR OUR ARMY

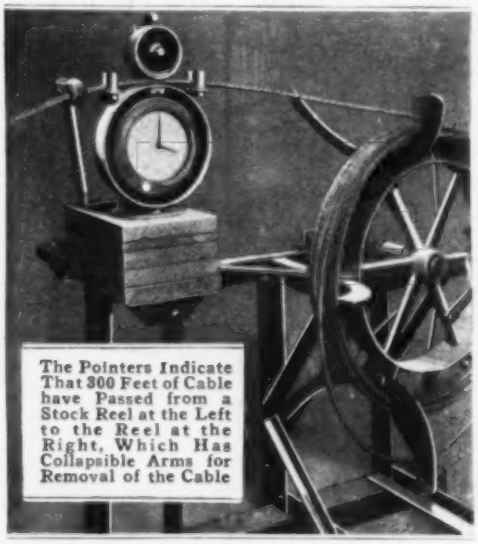
The government has recently purchased for our army six disinfectors of a new portable type, each of which is capable of purifying 50 uniforms and kits in 40 minutes. Either steam or formaldehyde and ammonia are employed as germicides. The outfit consists of a 5-hp. upright steam boiler and an air-tight chamber, 6 ft. long, mounted on a metal running gear. The rear end of the chamber is provided with a heavy door which can be hermetically sealed. Within is a rack mounted on wheels

Six of These Portable Disinfecting Outfits have been Purchased for the United States Army. Either Dry Steam, or Formaldehyde and Ammonia can be Used as a Germicide. A View of the Air-Tight Door is Shown at the Right

from which clothing can be hung, while small articles can be placed on an iron grating. After the chamber has been filled with dry steam from the boiler for the proper length of time, the garments are dried by a current of sterilized air and are then ready to be removed. Fastened to the side of the disinfecting chamber is a two-compartment tank from which formaldehyde and ammonia gas can be discharged into the inclosure when steam treatment is not desirable. An obvious advantage of an outfit of this sort is that it can be easily moved with the troops by horses or a truck. Several have been sent to Europe since the war began. A New York doctor is the inventor.

ROPE AND CABLE MEASURED BY A MACHINE

A machine that will measure accurately any length from 1 ft. up to 1,000 ft. of any size rope or cable, from the smallest cord up to 1¼-in. Manila rope or wire cable, is now available to those who manufacture or handle such supplies. It consists essentially of a large measuring wheel which is connected to and forms an outside case for registering mechanism, including a dial with two pointers indicating feet and hundreds of feet, respectively. Above there are guide rollers and a weight wheel to hold the rope in contact with the measuring wheel in its passage through the machine and thus insure the measurement and registration of every foot that passes. When a rope is to be measured, the pointers are set at zero by turning a small knob at the side of the dial, and the end of the rope is inserted between the guide

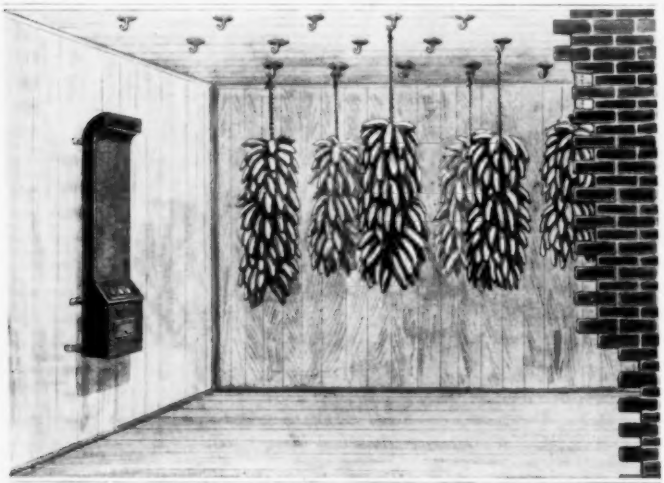


The Pointers Indicate That 300 Feet of Cable have Passed from a Stock Reel at the Left to the Reel at the Right, Which Has Collapsible Arms for Removal of the Cable

rollers and over the measuring wheel beneath the weight, then carried direct to a reel, by which any length required is pulled through.

IMPROVED GAS HEATER FOR RIPENING FRUIT

Commission merchants often find difficulty in securing the proper degrees of equable heat in rooms devoted to the ripening of bananas and other fruits. This difficulty is said to be obviated by the use of a new gas heater devised by a Normal, Ill., inventor. The heater is placed on the wall of a banana room and is made in a size to conform to the length of banana bunches, so that the fruit will not be heated in spots, or cook. An opening at the top, from which the heated air issues, is set about 2 in. above the top of the bunches, so that the heat passes over and down through the bananas, thus ripening them evenly. The gas burners are of the illuminating-flame pattern, to allow more perfect control of temperatures, and also to afford sufficient light in the room through mica windows in front of the heater. One heater is required to each 1,000 cu. ft. of space in the room to be heated.



Ripening Bananas with a Gas Heater That Takes the Cold Damp Air from the Floor, Heats It, and Circulates the Heat Evenly over and Down through the Fruit

PRIMITIVE LOG BRIDGES FOR WESTERN RAILWAYS

The abundance of logs and the scarcity of skilled labor in remote regions of the West have resulted in the contractors for certain pioneer railway lines resorting to quite primitive methods in the building of many bridges and viaducts. The logs cut from the path of the railroad have been roughly trimmed and piled, crisscross, to the desired height in the gullies and ravines, as shown in the accompanying illustration. The structures are held together by their own weight and by short bracing members which prevent the logs from shifting. At the lower part of the rustic and rather picturesque bridges the big tree trunks are so laid as to allow ample room for water to flow beneath unhindered.

A Good Example of the Crisscross Type of Railway Bridges Erected in Many Regions of the West Where Lumber Was Plentiful and Skilled Labor Scarce

¶A novel means of testing a detonator is to hang it so that it touches a lead plate. When the detonator is fired by means of the fuse attached to it, the explosion will cut a small crater in the plate and from this central point will radiate numerous scratches. The extent of the latter is a measure of the force of the explosion.

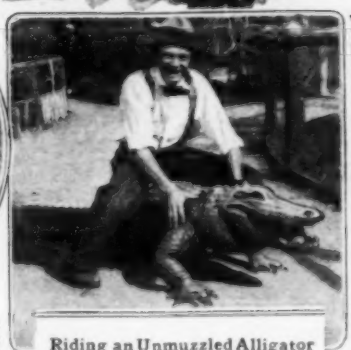
COMMUNITY OF ALLIGATORS AT TOURIST RESORT

Small Alligators are Handled by Their Tails with Comparative Ease. Care must be Taken, However, That They don't Get a Chance to Use Their Teeth, for, Like Bulldogs, They Hang On

The Alligator Farm at Venice, a Resort Place in Southern California, Attracts Large Crowds of Pleasure Seekers, Especially at Feeding Time, an Event That Comes About Three Times a Week for the Young Ones Like Those Above

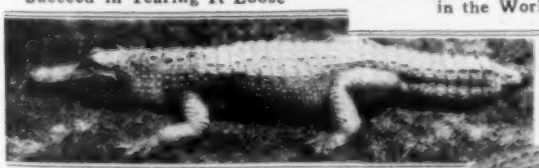
A Delightfully Accommodating Carryall for the Youngsters, When His Jaws are Safely Strapped Together

Grabbing a Piece of Meat between Their Teeth, the Small Alligators Roll Over and Over Until They Succeed in Tearing It Loose



Riding an Unmuzzled Alligator Is Not the Safest Performance in the World

One of the Ways the Young Alligators Enjoy Themselves: They Climb to the Top of the Chute, Await a Signal, and Then Slide Head First



"Louisiana Joe," Pictured at the Right, is Suffering with a Broken Jaw, and "Buffalo Bill," Above, Basking in the Sun, Is a Foot Shorter in Tail Length as a Result of a Brawl. The Two Recently Fought Desperately for Five Hours Before They could be Separated by the Trainers

Fellows of the Size of This One, Which Is Eight or Ten Feet in Length, Devour 40 or 50 Pounds of Meat at a Time and Then Go a Week or More without Further Nourishment

PAPER MODEL OF BIG TANK SHOWS STRUCTURAL MERITS

Some of those who are unfamiliar with architectural and construction work possibly do not appreciate the painstaking care that is quite commonly observed in preparing pasteboard models of residences, office buildings, bridges, and other works, before their erection. These structures in the miniature are not the result of idle toying by ingenious, time-killing craftsmen, but are made for definite, important reasons. Frequently a model will disclose a structural fault, or advantageously demonstrate architectural and engineering merits, that cannot well be brought out by blueprints. An interesting example of this form of work is afforded by a paper model of a 60,000-gal. water tank and 75-ft. steel tower built by an engineer connected with a Pennsylvania steel-construction company for the purpose of demonstrating certain principles to members of the drafting-room staff. The small replica is 32 in. high, the tank is 6 in. in diameter, and all other parts are as nearly proportionate as possible. Except for its wire bracing rods, the model is made entirely of heavy drawing paper. It will support a dry load of about 20 lb. without visible distortion. The steel tower and tank, of which it is a model, has been erected in Idaho.

¶ Several vessels in our navy, now equipped with direct-connected turbines, are to be re-engined, the first being two destroyers, the "Henley" and the "Mayrant," which will be provided with geared turbine units.

CARELESSNESS AT GRADE CROSSINGS SHOWN

In view of all the agitation which has marked the safety-first movement in recent years it is rather surprising, to say the least, to find that of those persons who pass over grade railroad crossings probably one-half, or more, fail to look to the right or left before moving across the tracks. This estimate is based on the reported findings of investigators for the California Railway Commission. In observing the drivers of 17,000 motor vehicles it was found that over 69 per cent looked neither way before crossing railway tracks. Something over two per cent looked in one direction only, while the remainder, less than 28 per cent, looked both to the right and left. Of 6,300 pedestrians 49 per cent looked neither way and 15 per cent looked only one way. It is believed that these figures may be taken as fairly typical of the country as a whole. They indicate both the menace of the grade crossing and the need of educating both drivers and pedestrians to greater caution.

AMERICAN STREET SHRINE OF CONCRETE BLOCKS

The site of a proposed church in Providence, R. I., is marked by a street shrine similar to those to be found in many parts of Europe, except that it is more modern in construction. The material for both the walls and the two pillars which ornament the front is concrete blocks. The upper half of the door is glazed and through it can be seen images, candles, etc. On the front of the door is a brass plate having a slot through which offerings can be deposited.

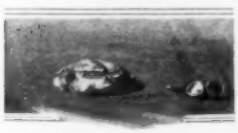
WIDENED SWEDISH CANAL OPENED TO TRAFFIC

The Trolhättan Canal in Sweden, which was recently opened after being widened and deepened, is a part of the Göta Canal system that extends across the lower end of Sweden and connects Göteborg on the west with the Baltic Sea, at a point about 90 miles south of Stockholm. What has been done to the Trolhättan Canal calls to mind the fact that in recent years Sweden has been actively engaged in adapting many of her waterways, constructed years ago, to large modern vessels. In this way a stimulus has been given to manufacturing centers that are springing up in great numbers to utilize the electrical energy generated by the plentiful waterpower of the country. Trolhätta Falls, which is near the canal bearing similar name, is one of the greatest of these power producers.

A View of a Smaller Picnic Trunk, Showing Its Shape When Closed and the Straps for Attaching It to the Robe Rail

STEEL HUMPS AT CROSSINGS REGULATE TRAFFIC

In the center of Los Angeles street intersections, at which traffic officers are not stationed, hemispherical disks have been bolted to the pavement for the purpose of regulating vehicular travel and preventing corner cutting. A fine is provided by city ordinance for the motorist who fails to keep to the right of these "mushrooms" in piloting his car in the thoroughfares.



¶ Giant Forest, a privately owned tract of mammoth trees in the heart of the Sequoia National Park, has recently been purchased by the government.

CONVERTIBLE PICNIC OUTFIT FOR AUTOS

A new type of trunk equipped with dishes and utensils for picnicking motorists is so constructed that when it is open, it serves as a table that can be used either inside or outside the car. After the case has been set on edge and opened, a hinged white-enamel leaf can be drawn up into a horizontal position and held in place by two folding legs, thereby serving as a table top. Knives, forks, spoons, and plates are within easy reach in their respective racks in the upper half of the container, while in that portion of the case which acts as one of the supports for the leaf are cups, bottles in spring-held racks, a pickle jar, and a provision box. The case is strongly made of basswood, covered with enameled duck. A similar case, smaller in size, can be had with less elaborate equipment.

Automobile Picnic Trunk Which Fastens to the Robe Rail and can be Used as a Table in the Car or on the Ground. It is Fully Equipped with the Necessary Dishes and Utensils

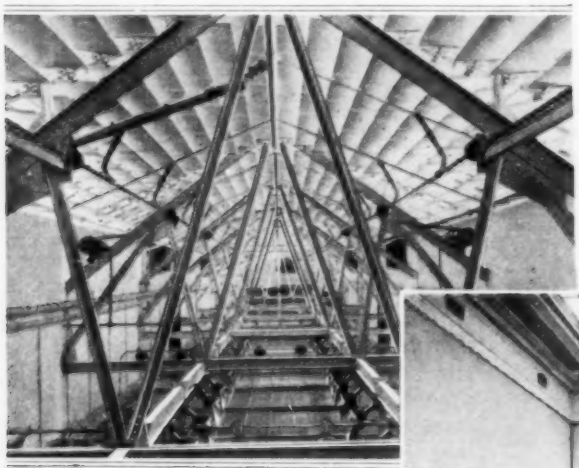
Left: Battery of Nine Boilers Installed on Field to Develop Steam with Which to Combat the Flames. Right: The Heavy Iron Cap was Moved Forward by Horses and Placed over the Well, Snuffing the Blaze and Controlling the Flow

STEAM USED TO EXTINGUISH FLAMING GAS WELL

Nine boilers recently furnished a flow of steam used in extinguishing a burning gas well near Blackwell, Okla., which had been ignited by an electric spark. Ten days were spent by a large crew of men in mastering the fire and capping the well, which has a flow of about 20,000,000 cu. ft. a day. When the steam had reduced the flames sufficiently to permit it, the iron cap—or "snuffer," as it is called in gas-field vernacular—was moved forward by horses and dropped into place over the roaring gasser, thus stopping the waste.

"DAYLIGHT" LAMPS USED IN ART GALLERY

One of the largest installations of "daylight" incandescent lamps thus far put into service is in successful operation in the new Museum of Art, in Cleveland, Ohio. The system gives a notable degree of control in the distribution of light, both artificial and natural. The admission of sunshine and daylight to the skylights over the painting galleries is controlled by means of motor-operated louvres, while in the artificial lighting of the museum the use of "daylight" lamps serves to bring out the true color values of the paintings and art objects when the galleries are illuminated for inspection after dark. In order to get as near to natural daylight as possible 150-watt incandescent lamps of a suitable make are used with hooded



This Shows the Arrangement of the Hooded-Reflector "Daylight" Lamps between the Skylight and the Subskylight of the Cleveland Museum of Art

Interior of One of the Galleries of Paintings, Showing How Perfect Illumination is Secured by the Overhead System

projector units, or reflectors, placed above the subskylight. A special holder was designed to adjust each reflector to the desired position to secure the best results. One lighting unit was provided for each 3 ft. or 4 ft. of wall length, the lamps were slightly frosted with an etching solution, and scoops were attached to the reflectors to intercept direct light from the lamps. Special means are provided for the appropriate illumination of various courts, loggias, and groups of statuary.

SANITARY CHIP BLOWER NEW DENTAL ACCESSORY

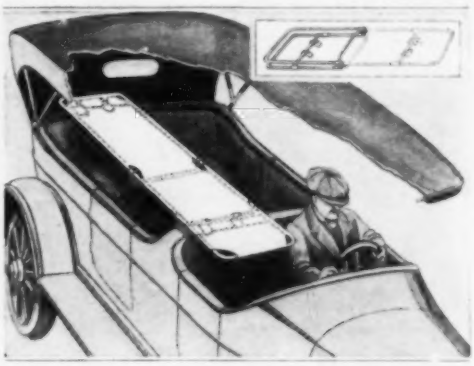
Hygiene preachments have brought about the invention of a dentist's blower which appears to be a real improvement over old types so far as the important question of sanitation is involved. Instead of taking in air through the nozzle, a special valve is provided

Germ-Laden Matter is Not Drawn into the Bulb, for, as Indicated, the Nozzle Has No Intake Valve

next the bulb and a double-acting one used in the tube, so germ-bearing saliva, blood, pus, and decayed matter cannot be drawn in. The instrument is of the usual pattern and, except for the features mentioned, is not dissimilar to those in general use. It is provided with two points and nozzles, so that one set can be sterilized while the other is in use.

SIMPLE FOLDING COT FOR MOTOR TOURISTS

One of the simple and very serviceable cots for use in connection with automobile touring consists of a frame of metal tubing, across which canvas is tightly stretched. The frame is provided with curved feet, which rest on the backs of the seats and are adjustable so that the cot can be used with any five or seven-passenger car. The cot frame is hinged at its center and can be folded up and stored back of



A Folding Cot Which Occupies Little Space in an Automobile: It Is Adjustable to Cars of Various Lengths and Consists of a Frame of Metal Tubing over Which Canvas is Tightly Stretched

the front seat or elsewhere. A dustproof bag is provided to cover it. Two of these cots can be used in a car at one time. If desired, they can be equipped with folding legs—a feature which makes them suitable to camp use.

EIGHT-SIDED BARN WITH FOLDING WINDMILL

An Iowa farmer is the proud possessor of a barn built in the shape of an octagon, or with eight sides instead of the customary four, and the barn is surmounted by a windmill of the vertical folding-blade type. At first sight the windmill structure looks like a water tank, especially when the blades

This Eight-Sided Iowa Barn is Topped by a Very Useful Windmill Which Does Many of the Chores

are closed against the wind and folded into a cylinder. The power of the windmill is transmitted from the central shaft by beveled gearing to a line shaft on the floor of the barn, and used to run the silage cutter, wood saw, feed grinder, and other machines that make life easier on the farm.

LOGGING CHUTE IS BUILT OF STEEL RAILS

Between forest and mill, in an Arkansas lumbering district, a steep hill, which intercepts the route, presented an obstacle in the way of transporting logs expeditiously. The grade was too precipitous to permit mule teams and loaded wagons to pass down it. Instead, however, of meeting the difficulty with a chute of the usual character, one was constructed with rails and ties. Four steel rails were laid parallel, about nine inches apart, the outer ones slightly elevated, and all of them inclined toward a common center to form a trough deep enough to prevent the logs from jumping out. This provided a slide which would not be reduced to splinters in a short time. A donkey engine was placed at the summit to help pull the logging wagons up the other side of the hill, while at the bottom and at one side of the chute a loading machine was installed to put the logs onto cars bound for the mill.

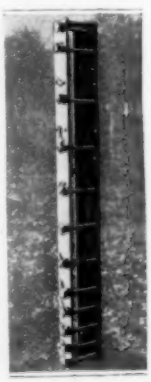
¶A two-reel movie has been prepared showing the United States marines in all phases of their daily work. It is announced that the film will be loaned free of charge to the theaters by the Marine Corps Recruiting Service, with a view to increasing enlistments.

BRITONS INSURED AGAINST GERMAN AIR RAIDS

One of the recent developments of the European war is the establishment by the British government of a public insurance scheme, whereby any person who desires to insure his house or other property against the risks of air-craft raids or bombardment may do so, either through his local fire-insurance company or the War Risks Insurance Office in London. The premium rates are the same for all parts of the United Kingdom. Dwelling houses and their contents are insured against air craft at a rate equal to about $1 for $1,000, and against both air craft and bombardment at the rate of $1.50. The premiums are 50 per cent higher in the case of business and manufacturing buildings or farming stocks. Unless the owner of property damaged in a raid is thus insured, no claim for damage will be entertained by the government, now that public insurance is in effect.

ANGLE IRON USED FOR FENCE POSTS

Timber for fence posts being scarce and high in price, an Iowa farmer has met the difficulty by making his posts of angle iron. End posts for the fences on his farm are made of two pieces of angle iron, placed together and set in cement so that they form a trough-shaped post. The uprights are held together by several crosspieces of strap iron, riveted across the back of the post at intervals of about 2 ft. To make the tightening of the fence easy, crossbolts are made to turn in their holes and the square heads are caught by latches after the wires are tightened. One piece of angle iron suffices for all other posts besides the end posts. The wires are fastened by short pieces of wire tied into small holes.



COPYRIGHT, H. B. TUTTLE

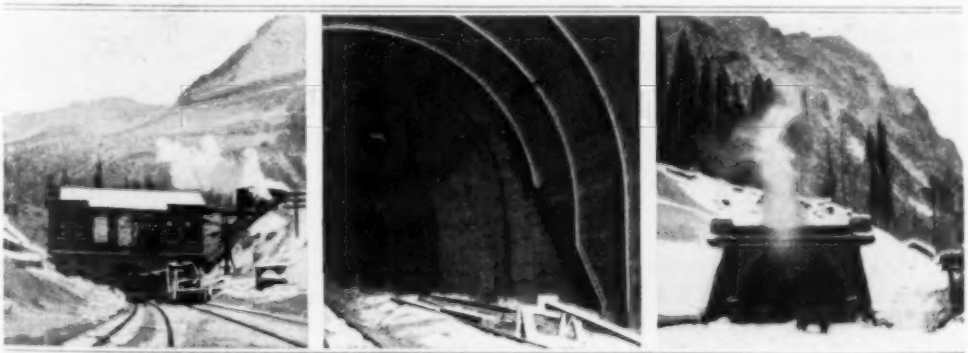
First Known Derailment of a Train by an Automobile: This Picture was Taken at Night, by the Aid of an Acetylene Torch, Before the Wreckage was Disturbed. The Collision Occurred Several Hundred Feet beyond the Auto Light, Seen in the Distance; the Rail Which Caused the Derailment Lies Ahead of the Engine

LOCOMOTIVE DERAILED IN AUTO ACCIDENT

The locomotive, tender, and one car of a passenger train on the Lehigh Valley Railroad were derailed in a recent collision with a speeding automobile at a crossing near Geneva, N. Y. The derailment was caused by part of the wrecked car becoming jammed in the frog of a switch, and the engine then plowed its way along an embankment, carrying the wreck of the automobile and a broken rail along with it, until it finally toppled over on its side. Three men were badly hurt, including the owner of the auto, his chauffeur, and the baggageman of the train. The chauffeur died of his injuries soon after. So far as is known, this is the first case of derailment of a train by an automobile.

LONGEST RAILWAY TUNNEL IN NORTH AMERICA

The Connaught Tunnel, driven through the Selkirk Mountains in British Columbia, on the line of the Canadian Pacific Railway, was opened for traffic on December 9, and is the longest railway tunnel on the North



Left: Approach to the West Portal of the New Connaught Tunnel on the Line of the Canadian Pacific in British Columbia. The Ventilating System is Installed Here. Center: Interior of the Great Nozzle through Which Air is Blown into the Tunnel to Clear Out Gases and Smoke. Right: Eastern Entrance of the Tunnel, Showing Gases being Blown Out by the Ventilating Engine and Fan Located at the Other Portal

American continent. It is exactly 26,400 ft., or five miles, long and carries a double-track line. It shortens the rail route by 4.3 miles, reduces the elevation of the track through the mountain pass by 552 ft., eliminates 4½ miles of snowsheds, and cuts out curves to the extent of seven complete circles. The cost was $5,500,000, including a ventilating system. Work was started on the main bore Jan. 15, 1914, from both ends. The headings met and passage through the tunnel was effected Dec. 19, 1915, making a new North American record for rapid work of this character. The tunnel passes under Mount Macdonald, which towers to a height of 6,000 ft. above the new railway grade.

¶A government crop specialist has developed a very large variety of Bermuda grass which is to be widely distributed in the South. It will be cultivated as hay and used as a binder for levees.

ROARING MOUNTAIN TORRENT GRAVEYARD OF MOTOR CARS

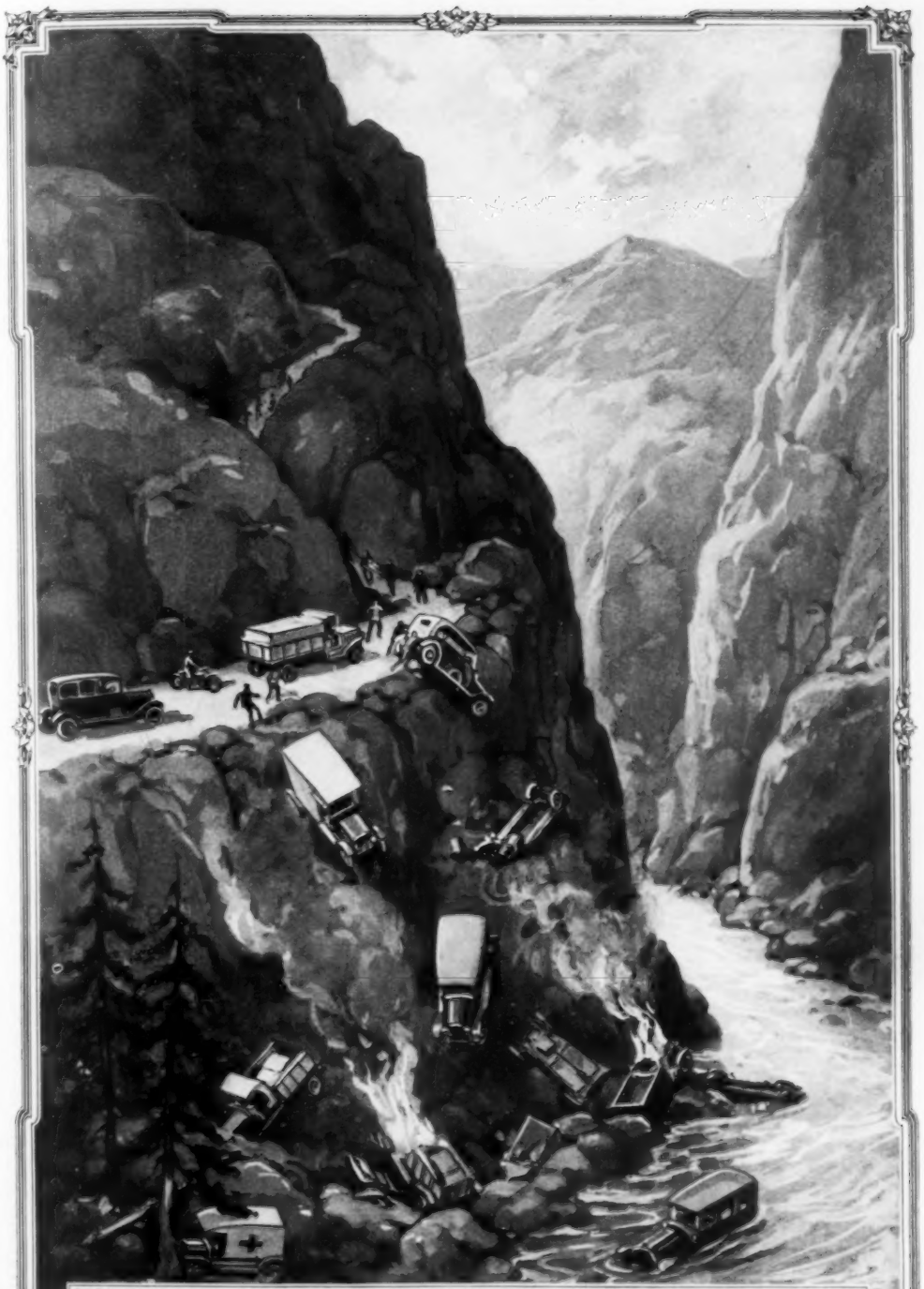
NO story in contemporary history is more replete with dramatic incidents than that of the passage of King Peter and his countrymen into exile, when Serbia's little army gave way before the overwhelming onslaughts of the Germanic hordes. One of the many spectacular episodes that marked this tragic flight across the mountains is narrated by a correspondent who reached the scene of its enactment, in company with the Bulgarian forces, a fortnight later. It is the account of the last of the Serbian war autos; a description of their abandonment and destruction at the end of a road where many refugees began their exhausting climb along the hazardous trails leading into Albania.

Leaving the last city in the line of retreat, touring cars, limousines, trucks, and ambulances were driven along a road that hugs the brink of a precipice as it follows the course of a roaring torrent through the mountain recesses. The opposite side of this road is sealed by almost perpendicular walls of rock. For several miles it proceeds thus, a splendid, picturesque highway. Then abruptly it stops at the foot of a narrow, steep path that wends up the cliff.

When the motor cars reached the end of this road they were no longer of use to the Serbs. Obviously there was but one thing to be done, and that was to destroy the machines so that they would not fall into the hands of the enemy. So, one by one, their wheels spinning and their unbridled engines roaring as they leaped through the air, the cars were shot over the edge of the rocky bank to dash themselves against the bowlders far below. In all some 300 vehicles made this death plunge.

As a car reached a point near the end of the pass and was relieved of its load, the chauffeur turned its wheels toward the precipice, raced the motor, got out, released the brakes, threw in the clutch, and stepped to one side. Over the wall went the machine, making a flying leap out into the air. Then, turning nose down, it fell like a rocket, struck, and flopped end over end, bursting into flames or diving into the water.

When the Bulgarians arrived two weeks later they found the charred and twisted remains of scores of cars strewn along the rock-set bed of the mountain stream. Here and there they were able to recover a tire or two, now and then an uninjured wheel or appliance, and in one instance a fine French limousine that in some strange manner was but slightly damaged. For the most part, however, they found nothing worth salvaging. As the machines had struck the rocks head first, the motors had been demolished. Then as they "pinwheeled" on toward the water, hitting first on one end and then on the other, the tires had burst.



The End of the Road: The Graveyard of the Serbian War Autos is Illustrated by the Picture Above, Which was Drawn from Sketches and Information Supplied by a Correspondent Who Reached This Point in the Mountains with the Bulgarian Forces Two Weeks After the Serbians had Passed It on Their Flight into Albania. It Shows How the Refugees and the Retreating Army Destroyed Their Motor Cars That They might Not Fall into the Hands of the Enemy

RANDOM GLIMPSES OF WAR CAUGHT BY CAMERA

COPYRIGHT, BROWN & DAWSON

Although It Has the Peaceful Appearance of a Harvest-Time Wheat Field, This Picture Shows an Austrian Battle Line. The Quarters of the Men are Protected with Straw so That Aerial Visitors will Pass without Noticing and Save Their Bombs for Other Places

COPYRIGHT, BROWN & DAWSON

Here Again Straw Spoils the Airman's View of What Is Below, and Makes an Artillery Battery Look Entirely Harmless from Above

The Wreck of This German Biplane Lies on Dutch Soil. The Pilot Lost His Bearings and Flew over the Border into Holland, where the "Neutrality Squad" Finished His Cruise by Winging the Craft. In Some Strange Manner Both the Pilot and Observer Escaped Death. Neither of Them was Even Badly Injured

Snipers are More Exposed to Fire than Ordinary Infantrymen. Therefore the Germans Supply Their Sharpshooters with Steel Shields That may be Fitted over the Front Half of the Helmet as Shown Herewith

WAR PICTURES OF RARE INTEREST AND NOVELTY

On a Sidetrack at Cairo Awaiting Departure to the Front, a Train Load of the Imperial Camel Corps' Mounts: The Beasts are Held by Headstall Ropes Made Fast to a Cable Extended along the Outside of Each Car. It Is Interesting to Note That the Camel, Although Hated by the Tommy, Still Holds Its Own

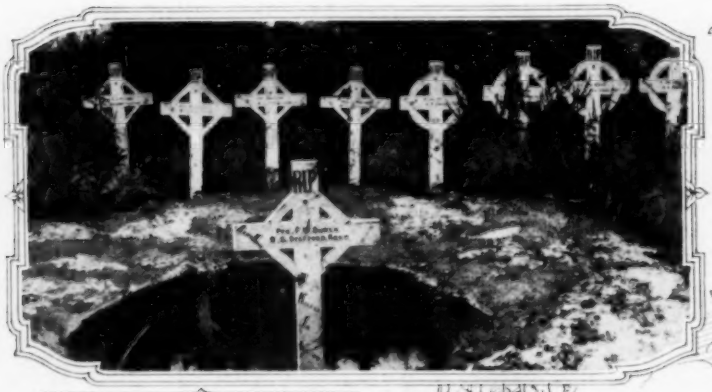
Transportable Steel Barricades of the Sort Pictured in the Sketch have been Found by the Germans at Several Fortifications Captured of Late. It will be Recalled an American Inventor Patented a Similar Device Not Long Ago

The Photograph Above Shows One of Several 100,000-Gallon Tanks Installed by the British at Military Camps at Home, in France, and in Belgium. It Indicates How England is Meeting the Perplexing Problem of Supplying Her Troops with Water

PHOTO COPYRIGHT UNDERWOOD & UNDERWOOD

When Official Reports Credit a French Airman with the Destruction of Five or More Enemy Aeroplanes He Becomes Known to His Fellows as an "Ace." The Pilot of the "Smiling Dragon," as is Indicated by the Insignia Painted on the Body, has Acquitted Himself with Honors in His Aerial Duels. Incidentally This Custom Reminds One That the American Indian Neither Wore Feathers, nor Hung Scalps before His Tepee, Solely for the Decorative Effect

"PEACE WITHOUT VICTORY"



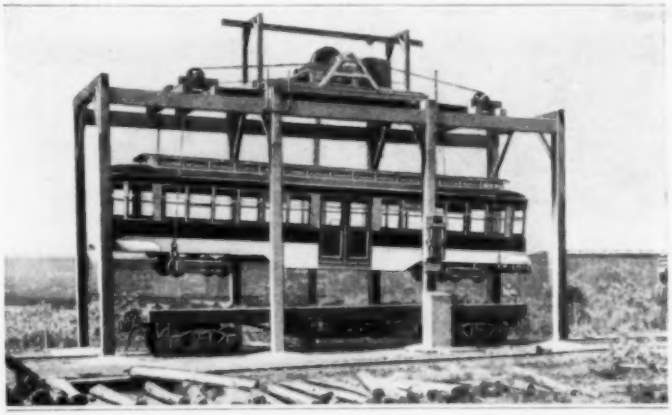
White Crosses Such as Those Pictured at the Left Mark the Burial Places of Thousands of British Soldiers Who have Fallen along the Western Front. When the Identity of a Deceased Fighter is Known His Name and the Place of His Late Residence are Printed on the Cross at the Head of His Grave. Likewise the Letters "R.I.P.," an Abbreviation for "Rest in Peace," and the Words, "Killed in Action," Appear

It Is Not Infrequent That a Bottle is Stuck Neck Down into the Ground at the Foot of a French Soldier's Grave. And in Such a Case a Slip of Paper Bearing the Deceased Fighter's Name is Always to be Found Inside

While This Funeral Service was being Conducted over the Bodies of a Group of Allied Soldiers Who had Distinguished Themselves in Battle, the Words of the Regimental Chaplain Who Officiated at the Ceremony were Drowned Time and Again by the Thunder-Clap Roars of Bursting Shells

HOIST FOR UNLOADING STREET CARS

A special hoist has been erected by the Detroit United Railway which makes the unloading of street cars from a freight train a comparatively simple task for two men. Without means of this sort a large crew would be required to do the work. The hoist is built over a sidetrack and consists of a strong wooden framework that supports motor-driven right and left-hand drums, around which four lifting chains are wound. After a street car to be unloaded has been moved into place beneath the hoisting apparatus, a heavy beam is placed under each end and attached to the lifting chains. When the load has been raised free of the flat car the latter can be withdrawn and the street car lowered to the tracks. The hoist is also employed in loading rolling stock and handling machinery too heavy for the regular shop equipment.



Hoisting Equipment Used to Lift Street Cars and Heavy Machinery on and off Freight Trains. It is Electrically Operated and with It Two Men can Do the Work of a Large Crew

MOTOR HORSE TRAVELS FAST ON SNOW OR ICE

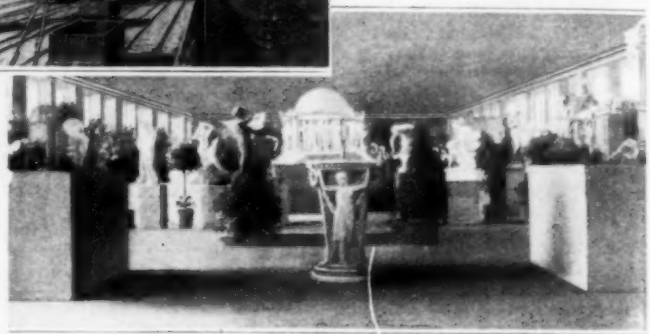
When a North Dakota inventor hitches up his "motor horse," he enjoys a sensation altogether unusual. It was first driven about the streets of Grand Forks and consists essentially of a motor wheel pivoted between a pair of sleigh runners, the rim of the wheel being equipped with studs, or spikes, which furnish rapid traction on either snow or ice. The driver may stand on skis or be seated on a sled or toboggan from 12 to 15 ft. behind the "horse," being drawn along by two ropes, while other lines serve for starting, stopping, steering, and regulating the speed. The complete machine weighs 51 lb. A special gasoline motor is built within and geared directly to the driving wheel. At one time a distance of 103 miles through deep snow was covered in 3 hr. 12 min. with the driver on skis. Under more favorable conditions much greater speeds have been attained.

With This "Motor Horse" the Driver has Traveled as Fast as 40 Miles an Hour on Skis, as Seen in the Picture. The Motor is Concealed in the Studded Wheel and Controlled by Lines in the Driver's Hands, Attached to a Lever, as Shown. The Other Lines Serve for Towing

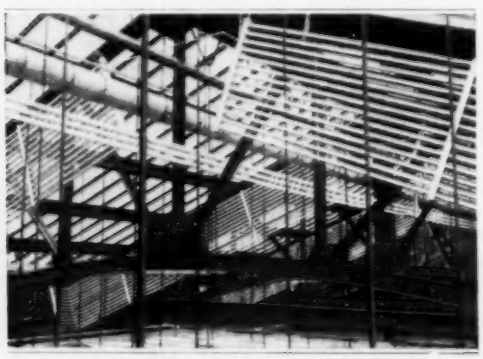
ART GALLERY BUILT LIKE BIG STEEL BRIDGE

New Addition to the Chicago Art Institute, Which Extends across Several Railroad Tracks and Has a Framework Very Much Like a Steel Bridge

An addition recently made to the Art Institute of Chicago constitutes a most unusual art gallery because of the fact that it is really a big inclosed steel bridge spanning a sunken railway right of way. The institute is a symmetrical two-story building in Grant Park, standing close to Michigan Avenue, and at the rear abutting on the sunken tracks of the Illinois Central Railroad. Increasing congestion in the galleries finally made expansion imperative, but an addition could not be erected at either side of the institute without marring its architectural symmetry. In spite of the railway tracks, expansion at the rear was the most feasible way of gaining more space. Consequently what is virtually a steel bridge was erected across the sunken area. It is 240 ft. long, 50 ft. wide, and two stories high, and cost $280,000. The addition was an expensive one to construct because its weight had to be supported entirely at the two ends and by a single pier in the center. This involved the sinking of caissons to hardpan, to a depth of approximately 90 ft., so as to minimize the vibrations caused by the passing of trains underneath. The extension increases the gallery space of the institute 40 per cent. Each floor is directly connected with a corresponding level in the main building. The first story is devoted to sculpture and the second to painting. The former is lighted from the sides by sets of double windows, the inner and outer windows being set far enough apart to allow the slanting side beams of the bridgelike frame to pass between them. The glass is frosted to exclude the view of the tracks beneath. The pictures in the upper galleries are finely illuminated by skylights. A feature of the structure is the heating system of the second story, which includes numerous big radiators placed in the loft just under the glass roof.



View of the Sculpture Gallery on the First Floor of the Bridgelike Addition. This Floor is Lighted by Frosted Windows Overlooking the Railway Tracks. The New Section Is 240 Feet Long and 50 Feet Wide



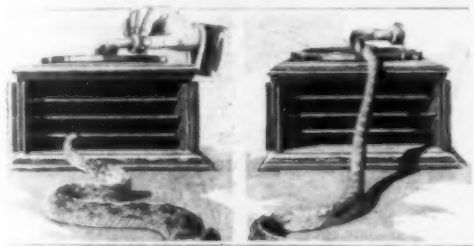
A Portion of the Loft under the Glass Roof, Showing the Radiators Which Are Part of the Novel Heating System

WORLD WIRELESS SYSTEM BUILT BY INVENTOR

The recently completed wireless station at Funabashi, Japan, is not, as many suppose, part of a government project. The big towers were built as a unit of the Marconi around-the-world system, a private enterprise which has gone far to make wireless a vital as well as convenient factor in international communication. The unusual photographs of the Hawaiian stations, reproduced in the February issue of this magazine, were published by courtesy of the Marconi Company.

MUSIC OF PHONOGRAPH CHARMS RATTLER

While the oriental snake charmer casts his spell over his reptiles with the weird notes of pipes, at least one



Views of a Pet Rattler of a Ft. Bliss Soldier, Showing the Reptile under the Spell of Phonograph Music

American exercises the same enchantment with the modern phonograph. He is a soldier at Ft. Bliss, Tex., and has a pet rattler, whose fangs have been removed. When the phonograph plays, the creature glides up to it and holds his head erect before the sound box, or tries to rest it on the record.

CEMENT MIXER BUILT FOR END AND SIDE DELIVERY

Convenience in operation characterizes a cement mixer made in Waterloo, Ia., which is so built that it can be set to discharge from either side or from either end, without moving the truck. This labor-saving feature is secured by incorporating a turntable between the framework of the machine proper and the truck frame. When the operator wishes to change from end to side dis-

It Is Only a Matter of 10 Minutes' Work to Shift This Machine so That It Discharges from Either Side Instead of from the End. This Change is Made without Moving the Truck

charge, or vice versa, four bolts are removed from the turntable and the mixer is swung about into the desired position, after which the bolts are replaced. This arrangement makes the outfit a convenient one in cramped quarters, and at the same time it can be used to the best advantage on street paving, or in other places where there is plenty of room.

MOTORCYCLING IN WINTER ON RIVER ICE

When the Vermont roads were covered with snowdrifts this winter, the young men of Brattleboro found a new winter sport in motorcycling on the

COPYRIGHT, INTERNATIONAL FILM SERVICE

Motorcyclists on the Ice of the Connecticut River: Equipped with a Single Runner and Side Seat, the Machines Made a Speed of 50 Miles an Hour

ice of the Connecticut River. By attaching a sleigh runner and a seat to the motorcycle, in place of the familiar sidecar, an ideal vehicle for the ice was evolved, and a speed of 50 miles an hour was made with ease, carrying a passenger in the side seat.

PORTABLE METAL BUFFER DRIVEN BY ELECTRICITY

The manual labor involved in polishing fittings, or ornamentations, of brass or other metal can be reduced to a minimum and considerable time can be saved by using an electrically operated polisher and buffer. The outfit is particularly serviceable in office buildings, hotels, on shipboard, etc. It comprises a ¼-hp. motor attached to a leather harness so that it can be carried on the back like a knapsack. Current is obtained through a lamp cord that can be connected with any near-by light socket. The motor drives a 5-ft. flexible shafting, to the end of which either a buffer or emery wheel can be fastened, according to the nature of the work in hand.

CANADA TEARS UP RAILS FOR ALLIES' USE

One of the numerous ways in which Canada has shown its readiness to meet emergencies created by the war, is in tearing up long sections of railway track in the Dominion, to provide the allied forces on the western front in Europe with needed transportation lines. The plan for collecting the rails, as reported from Ottawa, contemplated the removal of some 300 miles of government-railroad sidings in the East and also long stretches of track between Edmonton and the Pacific coast where two railways run parallel, the traffic of both lines to be accommodated on the remaining route. The plan, it was said, owed its origin to the British government, which intimated that prompt action of this kind would probably save thousands of lives, and that new rails could not be obtained because of the demand for steel in making munitions. It was estimated in Ottawa that over 1,000 miles of Canadian track would be torn up in response to the appeal.

REAR SIGNAL FOR AUTOS WORKS AUTOMATICALLY

Automobile owners will be especially interested in a recently invented signal device for cars because it operates entirely automatically and is of simple construction. It consists of a small red semaphore bearing the word "Stop," which is normally concealed behind the tail light and rear license number. It is connected by a flexible cable and a lever with the rod that operates the brake and the instant pressure is applied to the brake pedal—whether the driver intends to slow down or to stop—the semaphore automatically swings up into a horizontal position, in full view of those at the rear. Thus no special thought or movement is required of the driver. When the brake is released the arm drops out of sight. At night the translucent celluloid letters on the signal are lighted by a flash light, which makes them visible for a distance of 200 feet.

¶A slide rule, with slides of various sorts that are interchangeable, is now made of white celluloid impregnated with aluminum, giving it a smooth finish not affected by changes of weather.

NATION PAYS FINAL TRIBUTE TO ADMIRAL DEWEY

AMID honors equaled on but few occasions in the country's history, the Admiral of the Navy, George Dewey, hero of Manila, was laid to rest at Arlington, January 20, last. Following a private service at the Dewey residence, the casket was borne under escort of the entire brigade of midshipmen to the Capitol, where it was placed in the rotunda during a simple ceremony which was without an oration. A salute of 19 guns was fired at Fort Myer as the caisson carrying the casket entered the cemetery. When the reading of the service ended, a squad of midshipmen fired three volleys. Taps was blown, and the guns again saluted. The picture above shows the casket being borne down the Capitol steps, while that below was taken as the flag-draped caisson turned into Fifteenth Street from Pennsylvania Avenue on the way to Arlington.

PHOTOS COPYRIGHT BY G. V. BUCK

MOTORCYCLE TRANSFORMED INTO A SLEIGH

One of the neatest of the many methods of using the motorcycle on

Motor Sleigh Contrived by an Inventive Canadian When the Snow Was Too Deep to Run His Motorcycle: A Neat Arrangement of Runners Bolted to the Bare Rims

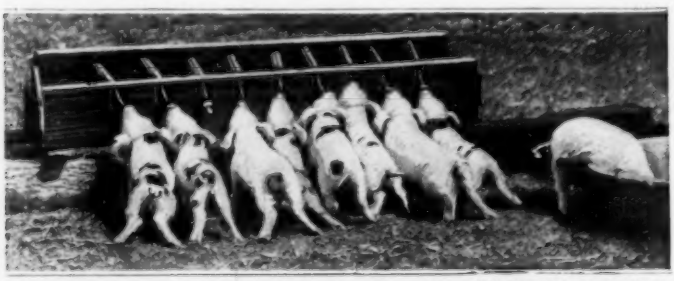
snowy roads in winter has been devised by a resident of Galt, Ont. He removed the rubber tires from the front wheel of his machine and from the wheel of the attached sidecar, then fitted a shapely runner under each of these wheels and bolted it to the rim. The rubber tire was left on the rear wheel of the motorcycle, for driving purposes, the front runner making a track for the tire. The machine made good progress in a foot of snow.

WHALE MEAT SELLS READILY IN WESTERN COAST CITY

Fresh whale meat is being sold in the markets at Los Angeles, while at Long Beach a fish cannery is preparing and packing it for general consumption. This is the first time, so far as can be learned, that the flesh of the whale has been introduced for the American table. In Japan, however, it forms an important part of the diet for the poorer classes, and in New Zealand large quantities of it are canned for South Sea islanders. A humpback whale will yield as much as 80,000 lb. of meat, in addition to blubber, oil, and bone. The flesh is of coarse grain, and when prepared, has a distinctive flavor that is somewhat similar to that of venison. But besides being palatable, 98 per cent of the material it contains is digestible, a ratio that is seven per cent higher than ordinary beef. The aversion which persons in this country usually manifest when attempts are made to encourage the consumption of things known domestically but not popularly looked upon as foods, has not been experienced in California with whale meat. A few weeks ago, five tons of the meat was retailed in Los Angeles at 14 cents a pound.

FEEDER FOR MOTHERLESS LITTER OF PIGS

The rather difficult problem of feeding a litter of little pigs whose mother has died, has been largely solved by an Oregon man who has devised an ingenious feeder consisting of a strong wooden rack which holds nine long-neck bottles in a row a few inches above the ground, with the mouth of each pointing downward at a slight angle. Each bottle is provided with a substantial rubber nipple held securely in place by a clamp so that a too eager little pig cannot pull it off. When the bottles are to be filled they are set upright by turning the rack over on its side.



COURTESY OF WESTERN FARMER

A Simple Feeder for Motherless Little Pigs Consisting of a Strong Wooden Rack in Which Nippled Bottles are Held at the Proper Angle a Few Inches above the Ground

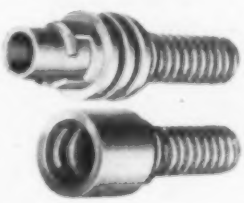
A Chicago Fresh-Air Sanitarium for Babies, Equipped with Woven-Wire Baskets Designed Especially for This Institution. Left, One of the Baskets, Showing How It is Supported. It Is Light, Open to the Air, can be Thoroughly Cleansed, and will Not Tip Over Easily

SANITARY WIRE CRADLES FOR BABIES' SANITARIUM

A fresh-air sanitarium in Chicago, where many hundred babies are cared for each summer, has been equipped with cradles designed especially to meet the sanitarium's demand for children's beds that would be light, open to the air, durable, comparatively inexpensive, and capable of being washed thoroughly; that would not tip over easily, and could be stored in a small space. The article finally selected as meeting all these requirements is a woven-wire basket, having high flaring sides, which is suspended by ropes from two posts like a hammock. The beds are finished so that there are no sharp edges or corners on which the little occupants can scratch themselves. In the course of the season many babies occupy the same basket, hence, as often as desired, all the clothing is removed and the wire framework thoroughly cleansed. When not in use, the cradles are removed from their supports and nested into compact stacks. These beds are now being made for use in the home also, and if desired are provided with woven-wire lids that clamp over the tops.

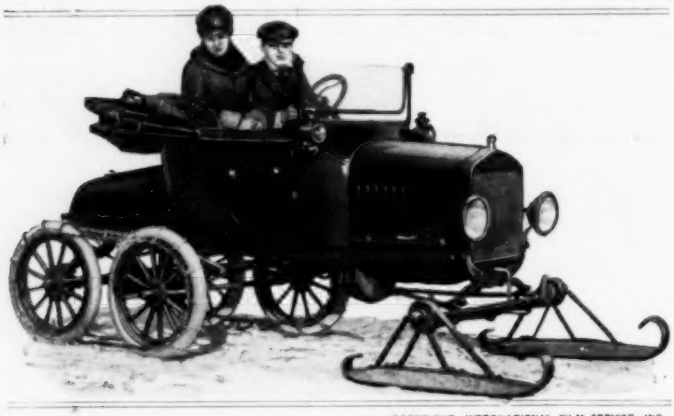
TIGHT SWIVEL COUPLING FOR HOSE

The kinking and twisting which is often so annoying in handling hose and so injurious to the tubing, may be eliminated by use of a patented swivel coupling now on the market. A feature of the invention is that the higher the pressure of the air, water, or steam passing through it, the tighter the joint becomes. The coupling consists of two sets of tubular parts provided with circular members, having lugs and notches, placed radially in such a way that after one tube has been inserted into the other a slight turn will serve to lock them together, without, however, interfering with the swivel action. The parts which lock together are held in place by a coil spring so that they will not accidentally come apart. To disengage the coupling a spring-held sleeve is drawn back and the interlocking members are given a twist. The coupling is provided with special clamps for the hose.



AUTO WHEELS CHANGED FOR DRIVING IN SNOW

A New Hampshire motorist devised a new plan of running his automobile during the winter, when he found it difficult with the ordinary arrangement of wheels to plow through the deep snow. He removed the front wheels of his car and set them farther back under the chassis, just in front of the rear wheels, then ran a set of chains around each pair of tandem wheels. A pair of steel sleigh runners, set in the place of the front wheels and connected with the steering gear, completed the arrangement, with which an average speed of 24 miles an hour was made over the winter roads.



COPYRIGHT, INTERNATIONAL FILM SERVICE, INC.

This Novel Grouping of Automobile Wheels, with Chains around Them and Sleigh Runners in Front, Prevented the Car from Sinking into Deep Snow and Made Winter Driving Possible in New Hampshire

NEW GAME STIMULATES INTEREST IN ALGEBRA

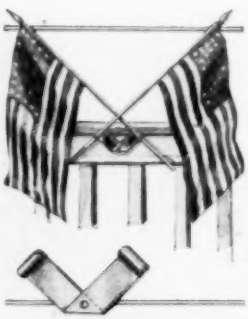
A card game resembling dominoes has been devised by a school superintendent in Clarendon, Ark., which develops in the players alertness in solving simple algebraic problems. The players in turn lay down numbered cards on the table so that at least one number on the newly placed card matches the number on the end of the row already in position. In calculating the score algebraic operations are necessary, for some numbers are positive and some negative.

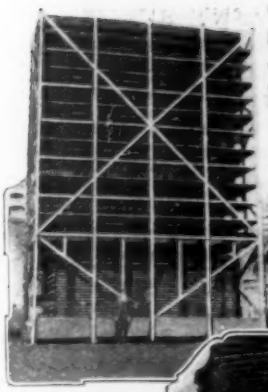
BAD ACCIDENT SERVES AS WARNING TO KITE FLIERS

That a cotton string may serve as a conductor of electricity, thus making kite flying in the vicinity of high-tension wires a dangerous pastime, is one of the lessons to be learned from the nearly fatal experience of a railroad employe at Burton, Kan. The man was trying to measure the distance by which a certain high-tension line cleared the railroad tracks. He tied a small stone to a cotton string, which he supposed was a nonconductor, and tossed it up over the wire that carried 60,000 volts. The shock he instantly received rendered him unconscious and in the 40 minutes which passed before he was revived he seemed wholly paralyzed. The current left a deep burn on his hand and a lighter one on his forearm. In passing from his body it severely burned his toes and heels and the sides of his feet.

HOLDER FOR CROSSED FLAGS

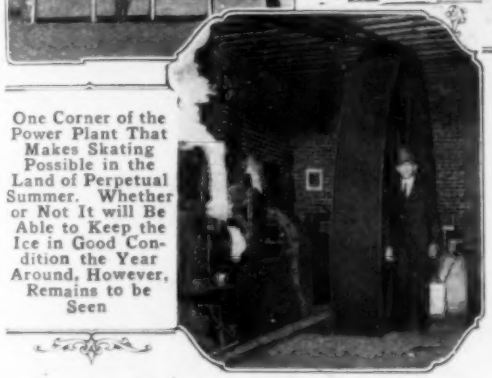
A convenient holder for crossed flags, which is very serviceable as an aid in decorating with national emblems, bunting, etc., is made of a strip of metal folded over at the center so that the two halves lie at right angles to one another. The ends are looped to receive the flagstaffs. The device can be fastened in place with one or more screws or nails.





At the Left is Shown the Water-Cooling Tower, Which Is a Part of the Refrigerating System Used in Connection with the Rink

This Sheet of Ice is Affording Hundreds of Californians Their First Opportunity to Skate. The Rink has Lately been Opened at Los Angeles and is Proving to Be a Most Popular Resort. It Accommodates Hundreds at a Time



One Corner of the Power Plant That Makes Skating Possible in the Land of Perpetual Summer. Whether or Not It will Be Able to Keep the Ice in Good Condition the Year Around, However, Remains to be Seen

ICE-SKATING RINK OPENED FOR CALIFORNIANS

Skating, by far the most favored of the winter sports, has been introduced in southern California where there are thousands of persons who have never seen ice except in refrigerators and delivery wagons. At Los Angeles a large inclosed rink has lately been opened to the public and is rapidly becoming one of the popular places of recreation. To tourists who are escaping the cold of the North, the chance to use ice skates without exposing themselves to severe weather is a new and welcome experience, while to permanent California residents who have never before had a chance to glide and whirl over smooth ice, the institution is a novelty. The rink is 65 by 210 ft. in size.

TRACTOR SNOWPLOW AND STREET GRADER

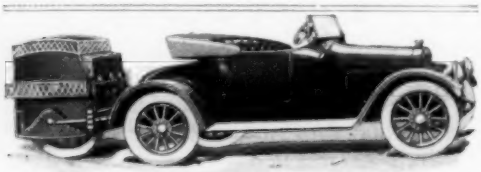
By a combination of two machines owned by the South Park Commissioners of Chicago, Michigan Avenue and other thoroughfares were rapidly cleared after each heavy snowfall of the passing winter. The first was a motor snowplow, small, compact, and

Electric Tractor Carrying a Snowplow and Hauling a Street Grader on Michigan Avenue, Chicago, after a Snowstorm This Winter: The Man Behind Raises and Lowers the Grade Plow as Required; in Front of Him Is the Seat of the Team Driver, the Grader being Usually Drawn by Horses

sturdy, the tractor being of the electric industrial variety now widely used in handling freight. To this was attached as a trailer a street-grading machine, usually drawn by horses, which widened the path cleared by the snowplow and left a flat smooth surface on the avenue for the automobile traffic which crowds it daily. Two men operated the combined machines, the idea being evolved in the park-board shops.

NEW AUTOMOBILE TRAILER HAS ONLY ONE WHEEL

Preparations are being made in the East for the introduction of a one-wheel trailer for the motor car. The vehicle is a modern adaptation of the wheelbarrow and designed to serve a wide range of purposes. On overland trips, it may be fitted with fuel, oil, and water tanks and employed as a tender and luggage carrier for the touring car. As a delivery van for the small retailer, a produce cart for the farmer, or a baggage car for the rural or interurban salesman, it is equally serviceable. The body, which is 46 in. in length and width and 40 in. high, is made of sheet iron, japanned to match the finish of the car with which it is used. It is attached to the rear axle of a machine by means of curved shafts which are supplied with a knuckle joint so that they may be raised or lowered to meet varying conditions. The trailer is supplied without interior fittings when desired. Especially for motor tourists, however, it is equipped with a stove, tent, combination bed and table, drawers, and tanks. Detachable wire baskets designed to be attached at the top and sides are provided if wished.



The New One-Wheel Trailer Attached to a Roadster

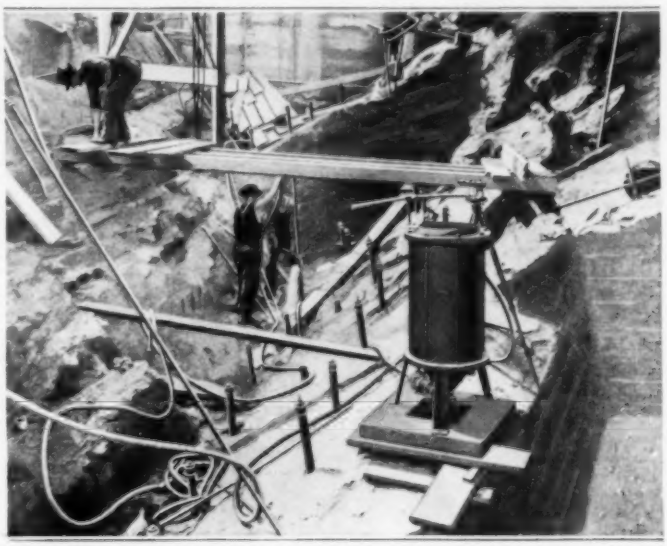
RISK POLICY "GUARANTEES" FAIR WEATHER

An out-of-the-ordinary policy, which Lloyd's of London recently issued, guaranteed to reimburse the owners of costly floats and others in Pasadena, Calif., if it rained on the dates of the city's rose tournament. The sum of $23,000 was to be paid by the British association if as much as ¼ in. of rain fell during the hours specified. The premium was $1,000. Though there was a slight drizzle on one of the days in question it was less than the stipulated minimum. Weather reports for the past 30 years were used by the insurers in calculating their risk.

Above at the Left is Given a Rear View, and at the Right a Front View, of the Interior Arrangement of the Trailer as Outfitted with Tanks, Drawers, and Compartments for the Overland Tourist

MAKING A DAM FOUNDATION WATER-TIGHT

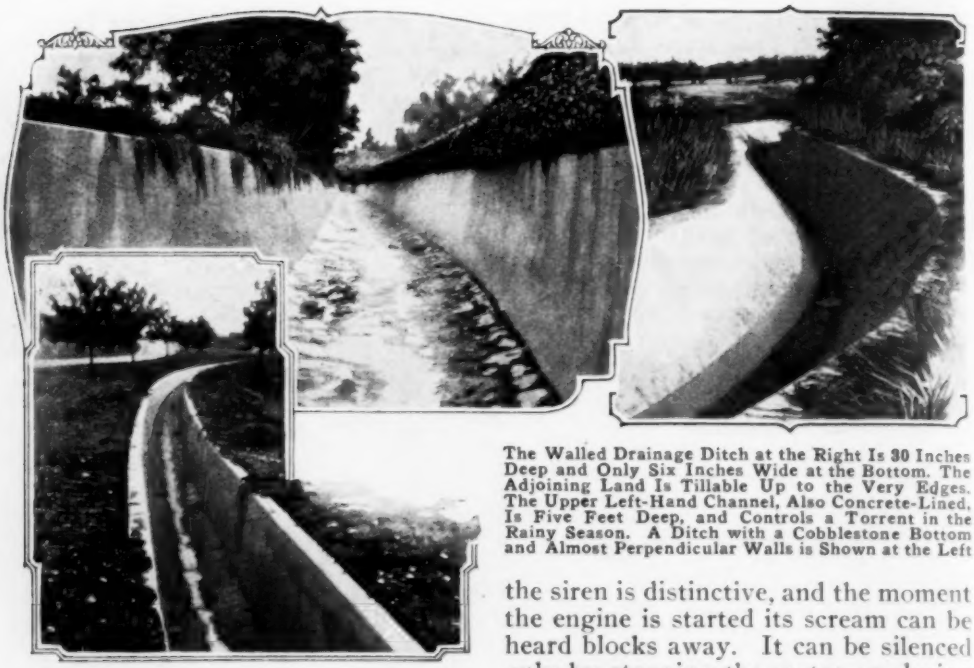
In building a huge dam for the improvement of the city water system of Worcester, Mass., special precautions were taken to make an underlying ledge of hard granite water-tight, the ledge being more or less broken up by fissures, due to the pressure of a near-by hill. After excavations were made to a foundation apparently sound, steam drills were used to test the ledge from 25 to 30 ft. below the bottom of the excavation. Through the drill holes water was forced at a pressure of 60 lb. to determine if any seams were crossed by the holes. If any of the water escaped, a cement grout of thin mixture was forced into the holes by a grouting machine under 90-lb. pressure, until the seams and fissures accepted no more. This practically insured the water-tightness of the foundation. In some places the drill holes were carried to a depth of over 70 feet, but fortunately none of the holes accepted more than about one barrel of cement. The masonry section of the dam is to be 375 ft. long and the whole length, including end sections of earth embankment with masonry-core walls, will be 850 ft. It will be 120 ft. in maximum height, 80 ft. thick at the base, and 17 ft. wide at the top, with a longitudinal inspection gallery. The dam will impound 3,000,000,000 gal. of water, thus doubling the storage capacity of the city's gravity supply system.



In the Center of This Picture Workmen are Seen Applying a Water-Pressure Test to the Granite-Ledge Foundation for a Big Dam, before Forcing a Cement Grout into the Drill Holes, to Fill Seams and Fissures through the Two-Inch Pipes Seen in the Holes

CONCRETING DITCHES TO CONSERVE THE FIELDS

In spite of the fact that the first cost is considerable, it has been found profitable to line drainage ditches on certain types of farms with concrete walls, thereby immediately putting a stop to the gradual widening of the watercourses which takes place with each succeeding flood, and preventing the formation of numerous small tributaries. These permanent walls soon pay back much of their cost, particularly where the land is valuable, by permitting the farmer to till right up to the edge of the ditch, which, if not walled, might have a wide-spreading border of marsh on both sides. The manner of putting in this reinforcing varies with local needs. A common way is to make the course V-shaped, bringing the walls just up to the level of the field and making them several inches thicker at the bottom than at the top. In the ditch of this character shown in the illustration, the dirt bed is but 6 in. wide, while at the top the walls are 6 ft. apart. Another way is to make the sides almost vertical, with the bottom composed of cobblestones, set in concrete. In regions subjected to long dry



The Walled Drainage Ditch at the Right Is 30 Inches Deep and Only Six Inches Wide at the Bottom. The Adjoining Land Is Tillable Up to the Very Edges. The Upper Left-Hand Channel, Also Concrete-Lined, Is Five Feet Deep, and Controls a Torrent in the Rainy Season. A Ditch with a Cobblestone Bottom and Almost Perpendicular Walls is Shown at the Left

spells, followed by torrential rains, whole communities sometimes find it profitable to coöperate in constructing artificial courses that are almost as big as canals. An example of a California ditch of this character is shown here, which is 5 ft. deep and has walls 18 in. thick at their lower edges. The bottom is paved with cobblestones and concrete.

ATTEMPTED THEFT OF MOTOR CAR SCREAMED BY SIREN

Motor-car thefts have become so alarmingly common that inventors the nation over have turned their attention to the development of devices for the protection of automobiles. One of the most recent of these contrivances is an extremely loud whistle which is blown by exhaust gases of an engine and controlled by a valve mechanism which, when either open or closed, is locked. The sound of the siren is distinctive, and the moment the engine is started its scream can be heard blocks away. It can be silenced only by stopping the motor or closing the valve with the key made for it.

JAPAN'S RAILWAY GAUGE MAY BE CHANGED

When the railways of Japan were first planned, the narrow gauge of 3 ft. 6 in. was selected for them, because it was cheapest to build and equip and was thought best suited to the country's narrow highways and steep grades. Now the 6,000 miles of Japanese railways, all of narrow gauge, are found to be sadly behind the times, and a movement is on foot to rebuild them to standard gauge, although the cost is estimated at nearly $450,000,000. At present the trains are slow, the fastest expresses making less than 30 miles an hour, the coaches are low and narrow, and the sleeping cars are cramped and inconvenient; while most of the railway inventions of other nations cannot be used because of the difference in track gauge and size of cars. The director of the imperial railways favors the change, in spite of the cost, and estimates that the main Tokaido line could be converted to broad gauge in 12 years and the other

lines on the main island of Japan within 25 years. The tracks and stations would have to be rebuilt, tunnels widened, and new rolling stock provided; but according to the government director there would be little interruption of traffic. Many business men of the empire oppose the change.

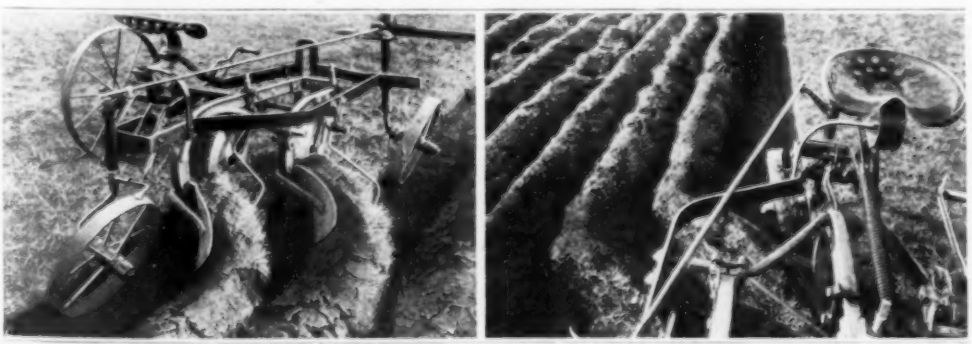
IMPROVED PLOW MAKES UNIFORM FURROWS

By a recent improvement in the construction of plows it is claimed that a remarkably uniform turning of the sod is effected and the plowshare is adjusted automatically when it meets with obstructions. A resident of Janesville, Wis., is the inventor of the new adjusting mechanism. This supports the plowshare flexibly, permits of the regulation of its position by a handle lever, and also allows the plow point to spring back and rise over an obstruction, instead of breaking against it. The plow may be equipped with two shares, which will turn double furrows and do the work in half the time required otherwise. The mechanism is practically self-leveling, there being no adjustments other than the rocking of the front bail to vary the depth of the plow. Thus a level furrow bottom is produced as well as a uniform furrow. Uniformity is insured by a peculiar outward twist, or curve, given to the upper portion or wing of the plowshare, which causes the soil of the furrow to turn over completely, and loosens it up.

COMPRESSED AIR USED TO STIR TANNERY VATS

Compressed air is employed in a New Jersey tannery to stir the contents of large vats in which hides are treated. The device employed consists simply of a ½-in. pipe, 8 ft. long, connected by hose with apparatus which compresses air to about 90 pounds per square inch. When the end of the tube is immersed in the solution in the vat and the air is turned on, the liquid fairly boils and a foam forms on the surface.

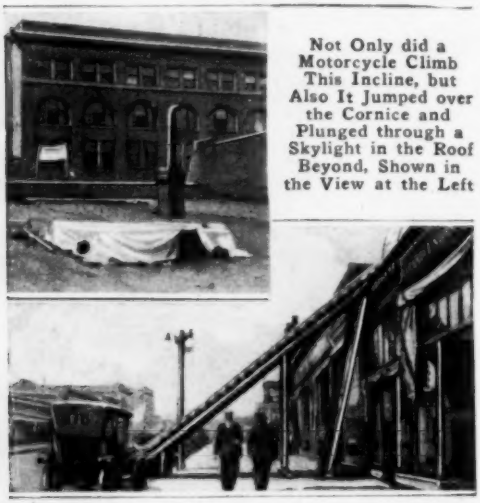
Stirring the Contents of a Tannery Vat with Compressed Air: Air is Forced through the Pipe Held by the Workman at a Pressure of 90 Pounds and Agitates the Fluid More Thoroughly Than could be Done by Hand



These Photographs Show the Evenness and Level Character of the Furrows Made by a New Plow That Works Equally Well When Drawn by Horses or by a Tractor

STEEP INCLINE NEGOTIATED EASILY BY MOTORCYCLE

During a home-week celebration at Walla Walla, Wash., some time ago, a motor-car dealer erected an incline in



Not Only did a Motorcycle Climb This Incline, but Also It Jumped over the Cornice and Plunged through a Skylight in the Roof Beyond, Shown in the View at the Left

front of his salesroom for the purpose of demonstrating the hill-climbing abilities of certain automobiles. The slanting driveway was extended from the sidewalk curb to the cornice of the one-story building at an angle of about 45 degrees. After several machines had failed in an attempt to reach the top of the incline, a young motorcyclist resolved to try the feat. His machine proved to be even more powerful than he believed. Becoming somewhat confused, he failed to stop the engine at the point he had planned, and instead of dismounting at the top of the incline, he rode entirely over the cornice and part way across the roof of the building. He managed to slide off the seat just in time to escape accompanying the motorcycle as it plunged through a skylight into the salesroom below.

¶As the result of a canvass of the makers of news-print paper on this continent as to their 1917 plans, it is declared that the proposed increased output of this paper will amount to only 600 tons per day. This would still leave a daily shortage of 300 tons.

CHINESE BRASS COINS ARE MELTED FOR COPPER

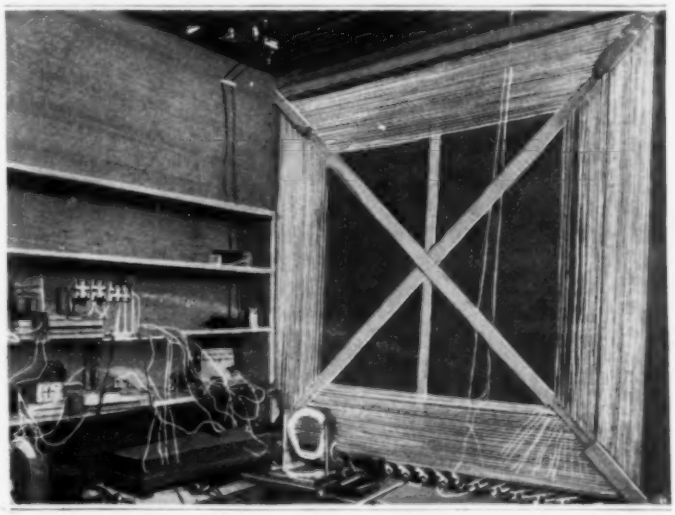
Recent reports from China indicated that a serious monetary situation was developing, due to the enormous export of brass "cash," the coins with square holes in the center that have been the basis of all trade in the interior of China for many generations. The export demand was due to the war-time rise in the price of copper, rendering these brass coins, which usually contain about 89 per cent of copper, more valuable as metal than as a medium of exchange. For some months over 6,000 tons of the coins were exported monthly to Japan alone, where the copper was extracted and shipped, it is said, to the United States. The business was profitable, as the cash were bought in China for about $12.50 gold per picul of 133⅓ lb. and were valued in Japan at the equivalent of $15 gold. The export continues and while there is an enormous quantity of such coins in China the number of cash in circulation at various points in the interior is already far below the requirements of the population, and difficulty is said to be experienced in carrying on ordinary trade.

NAMES SELECTED FOR NEW DREADNAUGHTS

The four new battleships to be constructed under the building program of the United States Navy for 1917 will be named respectively after the states of Maryland, Colorado, West Virginia, and Washington. These names are now borne by four cruisers, which will be renamed. The cruiser "Maryland" will hereafter be known as the "Frederick," the "Colorado" as the "Pueblo," the "West Virginia" as the "Huntington," and the "Washington" as the "Seattle." Contracts for the four dreadnaughts were let recently. The "Maryland" and the "West Virginia" will be built at Newport News, the "Colorado" and the "Washington," at Camden, N. J., and all will be pushed to completion.

NEW DIRECTION-FINDING WIRELESS RECEIVER

About 500 feet of wire, strung round a square wooden frame made of boards, and 20 switches by which portions of the wire can be "cut in" or "cut out"—this constitutes the new wireless receiving apparatus with which experimenters in the electrical department of Union College, Schenectady, N. Y., are said to have been able to receive messages during violent storms, and determine the direction from which they come. The wireless waves are received by the wires on this frame just as they are received by antennæ high in the air. They are then transmitted to tuning devices and a telephone receiver in the usual manner. It has been found that by turning the frame about until its axis is in line with the direction of the sending station, the signals are heard most distinctly. This direction-finding feature, it is believed, will prove of great value in many ways, particularly in cases where several stations are simultaneously signaling one operator, who, to avoid confusion, desires to accentuate one message over another. The improvement represents an application of certain principles of wireless telegraphy already well known, rather than the discovery of something entirely new.



View in an Electrical Laboratory of Union College, Showing the Big Square Wireless Receiving Apparatus Which Operates Regardless of Weather Conditions and with Which can be Determined the Direction from Which a Message Comes

POLICE CLUB SERVES AS EXTENSION FOR PISTOL

A policeman's club, which is so made that it can also be used as an extension to a pistol barrel, thereby changing the latter into a sort of rifle, has been invented by the sheriff of Alameda County, Calif. The extension has the outward appearance of an ordinary hickory club but contains a steel barrel so fashioned at one end that it can be quickly attached to a pistol's nozzle. It is said that it more than doubles the range of the firearm and makes possible greater accuracy in aiming. It is 14 in. long and weighs a pound. The invention has been officially adopted by the police of Oakland, Calif., and is also in use in several other parts of the country.

A Hollow Police Club, Invented by a California Sheriff, Which can be Quickly Attached to a Pistol Barrel, Thereby Increasing the Range of the Firearm

¶A vessel passed through the Panama Canal on December 17, last year, in 6 hr. 20 min., thereby cutting down by five minutes the best previous record for making the transit.

HORSE DENTIST'S "PARLOR" OPENED IN PHILADELPHIA

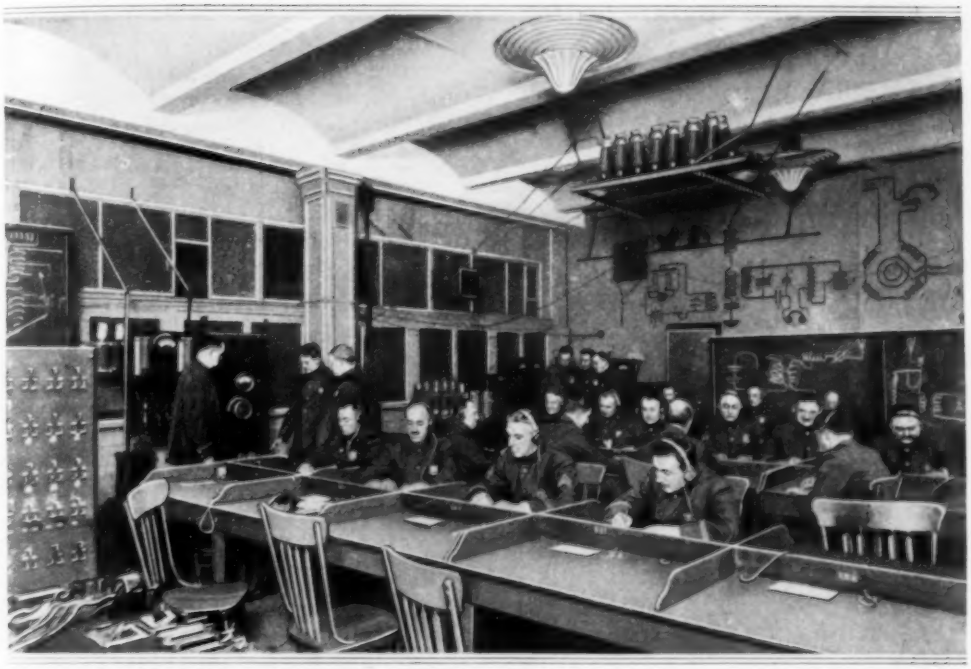
An establishment known as a horse dentist's "parlor" has been opened in Philadelphia, indicating that another specialized task has been added to the already long list of professions dealing with physical ills. The man in charge seeks to do for horses' teeth many of the things that regular dentists do for human teeth. If grain is lodged in a cavity or between a horse's grinders, a double-action pump is employed to force the foreign substance out. When a tooth is badly decayed it is extracted with big forceps. As yet this specialist does not attempt to fill horses' teeth, but in many cases he cleans them periodically. It is pointed out that one in this profession not only does acts of mercy by treating animals' teeth but he also restores the beasts to a condition in which they can render better service.

TIDES BUILD UP LAND AT ROCKAWAY POINT

A chart of Jamaica Bay, N. Y., near the southwestern end of Long Island, has recently been issued by the Coast and Geodetic Survey, which shows marked changes in shore line that the tides and currents have wrought in the past three-quarters of a century. From 1836 to 1908 Rockaway Point advanced westward more than three miles. Since the latter date the action of the ocean seems to have been confined to consolidating the new territory. With the aid of engineers the resorts in the region have taken profitable advantage of the work of nature and have reclaimed much land. The retarding of the "natural growth" of the point is due, it has been found, to the fact that the shore line now approaches close to the deep-water channel. The chart is particularly for yachtsmen and motorboat owners.

A Dental Office in Philadelphia Devoted Especially to the Care of Horses' Teeth

Left: Extracting a Bad Tooth. Proper Care of a Horse's Teeth Is Not Only an Act of Mercy but Enables the Animal to Render Better Service. Right: Flushing a Tooth Cavity with a Double-Action Pump to Dislodge Accumulated Foreign Substances



New York Police Officers Learning to Use Wireless Telegraphy in the Police Training School: Note the Instruction Diagrams on Walls and Blackboards and the Sending Apparatus in the Foreground

POLICE OFFICERS TAUGHT USE OF WIRELESS

Instruction in wireless telegraphy is given in one of the classes of the New York Police Department training school, and a wireless apparatus has been set up at headquarters. This is now working with stations in and around New York Harbor and is to be connected with a system of stations in the city. A number of private wireless plants have been placed at the service of the department for emergency work. Motorcycle couriers will carry messages from these plants to the district and precinct offices. There are eight certified wireless operators now on the force and 16 others are under instruction at the training school.

¶A Mexican choir and an American choir, standing on opposite sides of the international boundary at Eagle Pass, Tex., on Christmas Eve, alternately sang stanzas of a hymn appropriate to the season.

ADJUSTABLE NONSLIP DEVICE FOR CRUTCH

An attachment has been devised for a crutch, which can be quickly brought into use on slippery walks or pavements, whereas it need not be employed indoors or on other surfaces offering a firm footing. It consists of a sharp-pointed rod that is conveniently fastened to the side of the crutch so that a spring-held handle can be operated by the fingers without the wearer removing his hand from his crutch. By giving the handle a slight turn the rod is released and the point drops down far enough to strike the pavement.

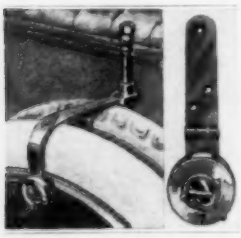
SMALL CRANE FOR FARM WAGON SAVES LABOR

A small crane has been designed especially for use on farm wagons, having a flat-bottomed rack, which enables one man to load large corn shocks, bales of hay, and the like, without difficulty. The crane is kept upright on the wagon by braces, which also can be made to serve as the rear-end support for the load. The device is fastened to an iron track, running lengthwise of the wagon, and along this it can be moved according to the demands of the load. The arm can be raised or lowered as desired. Lifting is done with the aid of tackle which fastens to the outer end of the arm. When a shock of corn, for example, has been raised to the right height it is swung around and deposited on the wagon without any undue exertion. The crane is equally serviceable in unloading. If desired a brace can be placed under the edge of the rack to prevent its tilting downward when produce is being hoisted.

A Small Adjustable Crane with Which One Man can Load and Unload Big Shocks of Corn, Bales of Hay, and the Like, without Difficulty

NEW-STYLE PADLOCK FOR TIRE PROTECTION

Spare tires carried on a motor car are protected from theft by a new style of padlock, which, in its standard form, has a long straight hasp, readily adapted to the shape of the tire. It is self-locking — a push button on the rim, when pushed clear in, springing the lock mechanism. The locking bar is contained entirely within the lock, and to break it open the whole case must be destroyed. It is practically impossible to secure any hold whereby the lock could be forced.



NEW FLASHING APPARATUS FOR LIGHTHOUSES

A new method of occulting a range light—that is, of transforming a fixed light into one that flashes at regular intervals—was successfully tested recently by the United States Bureau of Lighthouses. The experimental outfits were manufactured at the general lighthouse depot, on Staten Island, N. Y. Each consists of a frame placed in front of the lighthouse lens, carrying a number of vertical metal vanes or shutters pivoted on their vertical axes and arranged to be rotated through an angle of 90° by means of connecting rods. They are timed, as in ordinary occulting mechanism, by an operating clock. The shutters, or blinds, open and close instantaneously and make the light flash as desired.

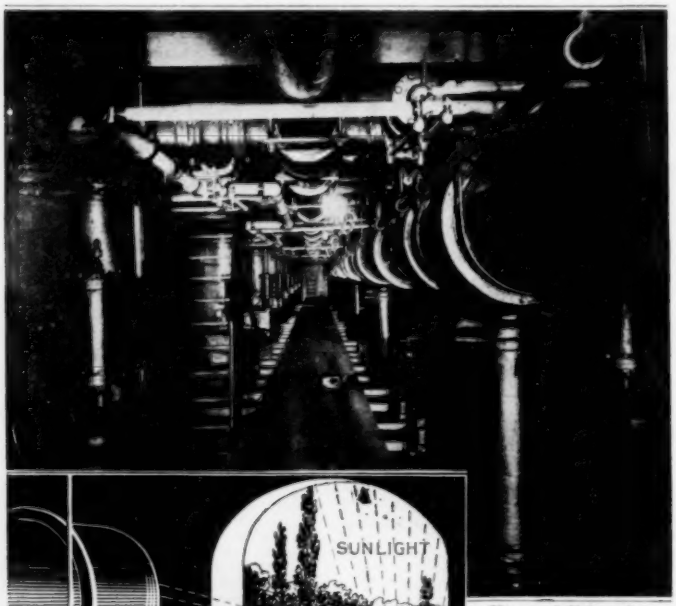
CRUISER AND SUBMARINE GO AGROUND ON BAR

COPYRIGHT, INTERNATIONAL FILM SERVICE

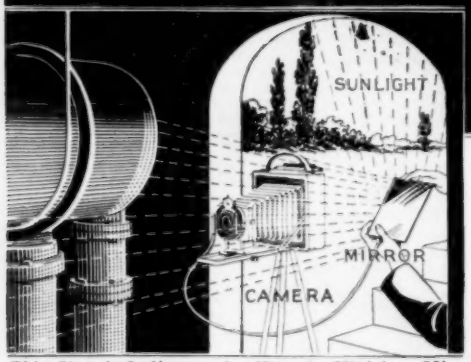
WHILE attempting to salvage the submarine "H-3," which struck a fog-hidden shoal off Eureka, California, last December, the cruiser "Milwaukee," flagship of the Pacific fleet's destroyer force, recently foundered. The "H-3," with two other under-sea fighters and its mother ship, the "Cheyenne," was proceeding from Puget Sound to winter quarters at Mare Island when it went aground near the entrance to Humboldt Bay. For eight hours it was battered by heavy breakers and driven shoreward. Members of its crew, consisting of two officers and 25 men, were buffeted menacingly, but none was seriously injured and all were saved when coast guards after heroic work made fast a breeches-buoy line to the diver. Just a month later the naval career of the "Milwaukee" ended when a heavy current carried the ship onto the same treacherous shoal during a fog. A contributing cause of this disaster was a heavy cable that harnessed the "Milwaukee" to the submarine it had been trying to drag into deep water. Above: ill-fated vessels in breakers; below, rescued submarine crew drying clothes.

FILTRATION-PLANT PIPING IS PHOTOGRAPHED IN ODD WAY

The apparently confused mass of pipes, large and small, revealed in the



View of Filtration-Plant Pipe Cellar Taken with the Aid of a Mirror Which Reflected Sunlight down the Passageway



This Sketch Indicates the Way in Which a Mirror was Employed to Reflect Sunlight into a Pipe Cellar While the Unusual Photograph, Shown Above, was being Taken

accompanying illustration is to be found in what is called the pipe cellar of a filtration plant in Trenton, N. J. The room containing these crossing and intersecting tubes is about 200 feet long. This unusual photograph was secured with the aid of a mirror measuring 7 by 10 in. It was so placed that it cast a bright beam of sunlight down the full length of the passageway.

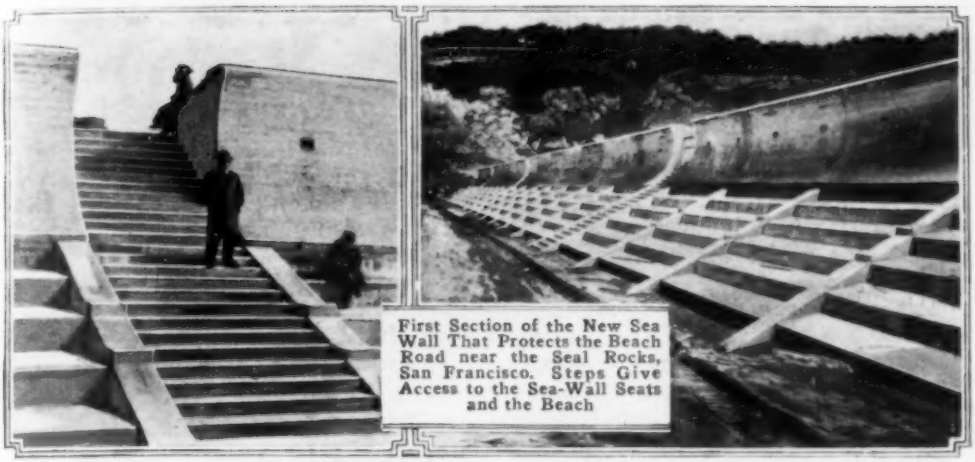
¶The waste bark which remains after the tannin has been extracted from it for leather work is now being used partly to replace expensive rag stock in the manufacture of felt roofing.

HOW IMPROPER COOLING AFFECTS STEEL RAILS

In an investigation which a consulting engineer for an eastern railway has reported on to the American Railway Engineering Association concerning the conditions producing transverse fissures in the head of rails, the fact is brought out that in winter the low temperature in which rails are cooled in the mill after rolling apparently is one of the factors which produces hidden defects. It is shown that if some rails are allowed to stand longer than others they are liable to be chilled, and so frequently develop imperfections. The investigation shows, further, that in cooling rails on hot beds often insufficient attention is given to spacing them. When the rails are placed close together those in the center of the group are affected by the heat of adjacent rails and so acquire an excessive curve in cooling. Such irregular ones require several blows of the hammer used to straighten them out. On the other hand, if the rails are set some distance apart, say, 6 in., they are free from contact with each other and they cool nearly straight. Hence they require only a few light blows to perfect their shape and so are less subject to defects.

NEW SEA WALL PROTECTS OCEAN ESPLANADE

To protect the esplanade along the ocean beach near the famous Seal Rocks, the city of San Francisco has completed the first section of a concrete sea wall of novel type. The wide base is in the form of a series of steps, re-



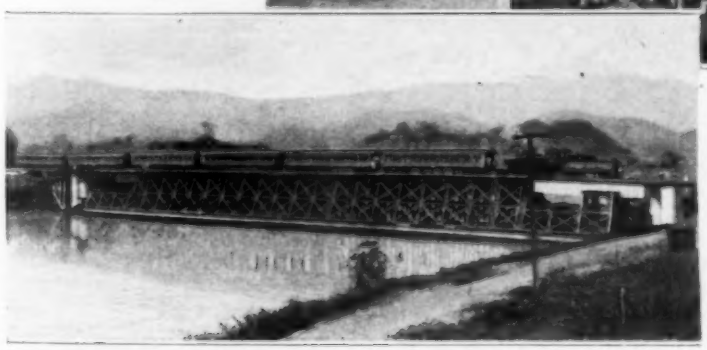
First Section of the New Sea Wall That Protects the Beach Road near the Seal Rocks, San Francisco. Steps Give Access to the Sea-Wall Seats and the Beach

sembling bleachers, which can be used as seats by visitors in summer. Above and behind these is a high incurving wall, which is expected to withstand the heaviest seas of winter. Behind the parapet, a 20-ft. walk has been constructed, with curb and gutter. Drinking fountains and electric lights are provided and future extensions of the sea wall are planned.

LONG, FLOATING RAILROAD BRIDGE ACROSS CANAL

At Paraiso, a point about two miles northwest of Miraflores, a swinging pontoon bridge carries the Panama Railway across Gaillard Cut to the west side of the canal where military posts are situated. So that they would not infringe upon the width of the channel, the abutments for the approaches were established in pockets excavated in the sides of the waterway, while on the east bank a long recess was dug to receive the bridge when open. This harbor extends south

The Picture Above, Taken While the Construction Work Was Still in Progress, Shows the Long Pontoon and Trestle Drawn along One Side of the Canal



The Floating Bridge Accommodates Railway Traffic between Opposite Banks of the Canal at Paraiso. When Opened, It is Swung Out of the Channel into a Recess

of the abutments. Since the bridge is pivoted at the northeast corner, it can thus be swung entirely out of the channel when opened. The pontoon is 378 ft. in length and has a width of 55 ft. It is constructed of heavy timbers, fitted with six longitudinal bulkheads, and supplied with a pumping system for discharging bilge water. The deck, which has a sheathing of 4 by 10-in. timbers, calked, is surfaced with asphalt. An apron, 65 ft. long and weighing 150,000 lb., is hinged at each end of the trestle to effect a rail connection with the piers. These members are raised when the bridge is moved, and when lowered for use are locked in place in such a manner that they are held against vertical and lateral movement. A so-called "wild-cat" wheel and chain, installed at the outer end of the structure, permit the bridge to be opened or closed readily when the operating motors are started by the attendants.

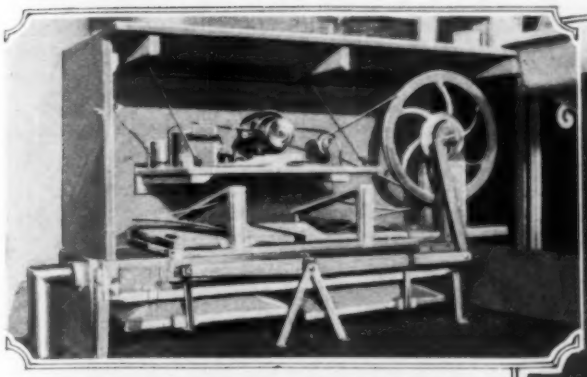
CONVENIENT HOUSE BOAT USED ALL YEAR ROUND

A very attractive house boat has been constructed by a resident of Medford, Mass., for use the year round, which is patterned after craft to be found on the Thames River in England. It is 42 ft. long, 17 ft. wide, and draws 14 in. of water. On the lower deck are six rooms, one of which is a sun parlor, and a bath. On the upper deck are two sleeping rooms and a wide veranda. The boat is electrically lighted, current being generated for storage batteries with the aid of a gasoline engine. This engine also pumps water for the water system. In cold weather the rooms are warmed by steam heat. All of the rooms have beamed ceilings and are tastefully furnished in mission style. The walls are of fiber board.

BUILDS PIPE ORGAN FOR HIS OWN HOME

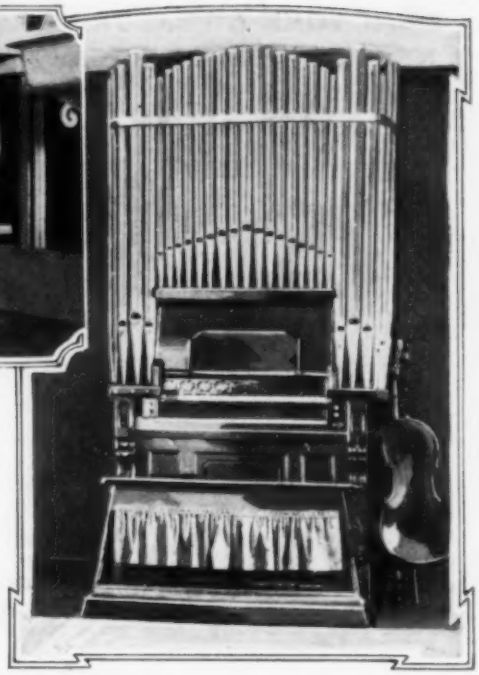
By rebuilding and adding to an old organ which he purchased from a church in his town, a musician in Girard, Kan., has equipped his home with a pipe organ of excellent quality and pleasing appearance. The old instrument had but one set of keys and its pump was operated by hand. The purchaser built a number of large pipes and a set of pedals, which are played in the same way as keys, and added them to the instrument, that now occupies a prominent place in his living room. In the kitchen a neat cabinet was built to contain a $\frac{1}{20}$-hp.

Eight-Room House Boat, Patterned after English Craft, Which is Electrically Lighted, and Steam-Heated



Motor and Homemade Bellows Installed in a Cabinet in the Kitchen, Which Supply the Organ with Air

motor and the bellows by which the organ is supplied with air. The motor operates two large bellows that force the air into two supplementary bellows instead of directly into the organ. These secondary air chambers are under pressure and serve to maintain a steadier air supply for the pipes. Much ingenuity was shown in making the additional parts and in adding them to the reconstructed organ, which has the appearance of a factory-made instrument.



Homemade Pipe Organ Rebuilt from an Old Organ of Smaller Size

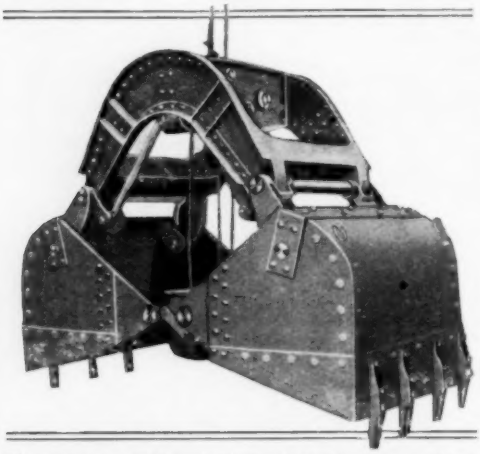
DANCE TICKET PREVENTS ERRORS BY PARTNERS

A dance ticket, or tabulator, has been designed, the purpose of which is to prevent confusion in claiming partners at a ball. It consists of a strip of cardboard, about eight inches long, divided by transverse perforations into as many sections as there are dances on the program. Each ticket bears at the top a number which is not duplicated on any other ticket. This number is repeated on each of the sections, which are also numbered in rotation, 1 being at the bottom. Each lady is provided with one of these tabulators and as fast as she fills up her program she presents her future partners with sections of the ticket corresponding to the dances which they have engaged. Later, as the dances are called, the gentlemen present their slips and claim their partner, each in his turn. In this way all errors are avoided, for each slip bears the number of a dance and also the lady's number. A dance can be reserved in advance by marking the corresponding section with "R," if desired.

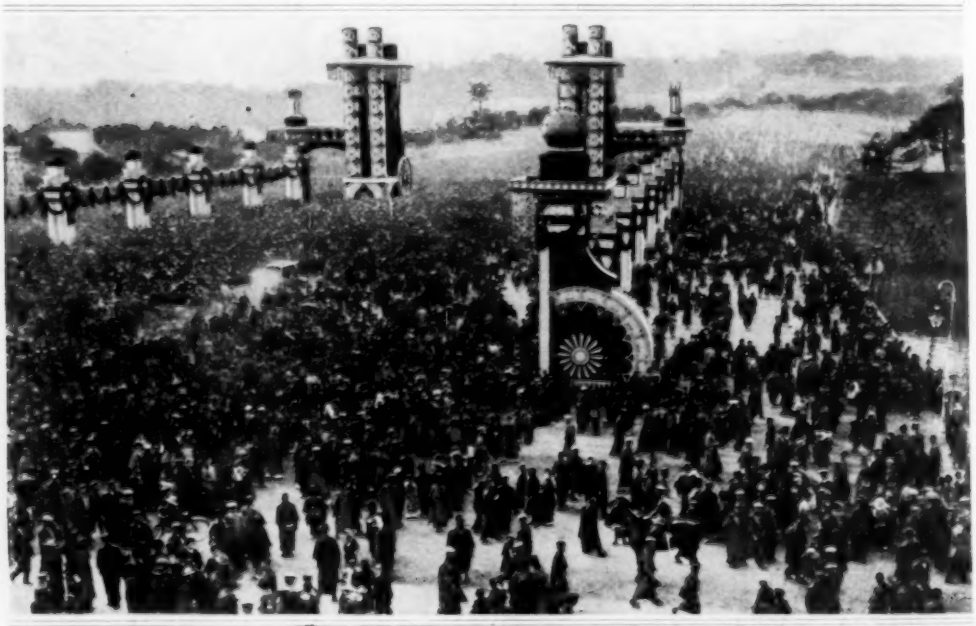
A Dance Ticket, Composed of Numbered Detachable Slips Which are Given Out, by the Lady Wearing the Ticket, to Her Partners as Fast as They Engage Dances with Her

ARCH YOKE A FEATURE OF NEW CLAMSHELL BUCKET

A clamshell bucket has been placed on the market in which have been embodied a number of new features for the purpose of giving it compactness, rigidity, and great closing power. The height of the bucket is considerably less than that of types commonly used. The two halves, or bowls, are pivoted to either end of a steel arched yoke and also linked to each other. The clamshell is closed by means of cables which pass about sheaves situated at the juncture of the two bowls. These working parts are entirely inclosed in a cast-steel case which protects them from dirt, gravel, or the like. When the implement is open it forms a continuous, rigid steel arch that can be dropped from a great height so as to drive its blades into the material to be excavated. The distance between the points where the bowls are joined to the arch and the points where they are linked to the working parts referred to, is sufficient to give the bucket unusual closing power.



New Type of Clamshell Bucket Having a Steel Arched Yoke and Other Features Which Give It Compactness and Strength



COPYRIGHT, INTERNATIONAL FILM SERVICE, INC.

TOKYO A GALA CITY IN CROWN PRINCE'S HONOR

IMPRESSIVE oriental pageantry, comparable to that accompanying the Japanese coronation, marked the recent formal proclamation of Japan's 16-year-old crown prince as the heir apparent to the throne. A portion of the vast concourse of subjects who waited for the passing of their future ruler on his way to his installation, as it has been called, is shown here, together with some of the distinctive Japanese decorations that surrounded the plaza at Babasaki Gate. At night the whole city of Tokyo, including these and many other festal adornments, was brilliantly illuminated.

WHAT DID THE CENSOR CUT?

Unusual Prize Contest Interests Persons of Many Nationalities and Occupations

ANNOUNCEMENT OF PRIZE AWARDS

FIRST PRIZE, $200, Walter W. Baker, Portland, Ore.

"The practical solution of London's aerial defense came with the discovery that searchlights could be used as range finders. The simple range-finding theory that a measured line forms the basis for computing all distance was applied by pinning an airship on the apex of two shafts of light to prove its exact height and distance from a gun battery by its angle. Immediately the highly theatrical searchlight play, together with the ragged, ineffectual gunfire of early raids, was abandoned and London became a vast mathematical chessboard, with a searchlight at each corner and a battery of high-powered aerial guns in the center of every square; both operating to deliver time shells with such grim orderliness and accuracy that aeroplanes may now practically surround the doomed target without fear of themselves being hit."

SECOND PRIZE, $100, Charles C. Dunning, Pittsburgh, Pa.

"This has been accomplished by locating powerful searchlights at definitely spaced intervals along radial lines centering at the heart of London. Each light sends out a slightly divergent beam which swings back and forth across a predetermined arc of the sky. This results in the lights along a diameter producing a fan-shaped sector of intense illumination which sweeps across the sky, covering an angle of about 120 degrees. The methodical crossing and recrossing of these light sectors render it impossible for a Zeppelin to avoid being located. Once this has been accomplished, certain lights are detailed to follow the doomed airship while the guns and aeroplanes deliver the deathblows."

MANY thousands of readers were interested in the prize contest announced in the recent December issue of Popular Mechanics Magazine, when cash prizes of $200 and $100 respectively were offered for the two best answers to the question, "What Did the Censor Cut?" The question referred to a paragraph deleted by the British censor from Lewis R. Freeman's article, "Bringing Down a Zeppelin," which appeared in the same issue, with the place and extent of the deletion clearly indicated. Contestants were required to write and submit suitable "copy" to replace the matter censored, this being a complete paragraph of about 12 typewritten lines of the usual length.

The December magazine appeared on the news stands November 20th, and the contest closed at midnight Dec. 31, 1916, by which time replies had poured in from 47 of the 48 States of the Union (all but New Mexico); from the District of Columbia (Washington); and from eight of the nine provinces of Canada (all but Prince Edward Island); while Newfoundland and Porto Rico were also heard from. Time was allowed for all replies mailed up to December 31st to reach the office and only a few late arrivals failed to receive consideration by the judges who decided the contest.

Among the contestants were Americans of all ages and conditions, with a fair sprinkling of women, and representatives of many other nationalities, including Austrian, Belgian, Canadian, Danish, Dutch, English, French, German, Greek, Hungarian, Irish, Italian, Jewish, Japanese, Norwegian, Polish, Russian, Scotch, Swedish, Swiss, and Welsh readers. The occupations of the contestants covered a similarly wide range. Replies were received from a bishop of the Episcopal Church, a well-known brigadier general (retired) of the United States Army, a commander in the United States Navy, the commander of a Pacific coast fort (Coast Artillery), an instructor of the United States War College, a manufacturer of aeroplanes, the city engineer of a large municipality, several

professors in large universities, consulting engineers, newspaper editors, and school superintendents.

While so many nationalities and vocations were represented, the neutrality of the great majority of the replies was remarkable. With few exceptions the contestants made a serious effort to rewrite Mr. Freeman's censored paragraph. Many of them had a high percentage of merit and received final consideration with the prize-winning paragraphs, which were preferred by the judges.

OCCUPATIONS OF CONTESTANTS
(So far as could be determined from their letters)

Advertising Men
Aeroplane Mechanics
Agricultural Students
Airmen
Amusement Managers
Automobile Salesmen

Bishop (1)
Blacksmiths
Bond Salesmen
Bridge Engineers
Brokers
Builders

Carpenters
Cattle Men
Chemists
City Employes
City Engineers
City Firemen
Civil-War Veterans
Clerks
Club Employes
Consulting Engineers
Contractors
Cotton Brokers
County Employes
Court Reporters

Cowboys

Dentists

Electrical Engineers
Electricians
Engineers
Engravers
Express Agents

Farmers
Foresters

Garage Men
Gasoline Engineers
Grain Brokers

High-School Students
Highway Engineers
Horticulturists
Hotel Employes
Hotel Managers

Inspectors
Instructors
Investigators
Irrigation Men

Jewelers

Lawyers
Linemen
Lumbermen

Machinists
Managers
Manufacturers
Marines
Mechanical Engineers
Mechanics
Metallurgists
Meter Inspectors
Mining Men
Ministers
Motion-Picture Men

Newspaper Men
Newspaper Women

Office Men
Officers of the Army
Officers (Retired)
Oil Men

Physicians
Poultry Men
Printers

Railroad Men
Ranchmen
Real-Estate Agents

Sailors
Salesmen
School Directors
School-Teachers
Soldiers
State Employes
Stationers
Steam Engineers
Stenographers
Stockbrokers
Students

Teachers
Telephone-Company Employes
Theater Managers
Theologians
Typesetters

Veterans of European War

Y. M. C. A. Workers and Members

THE PRIZE WINNERS

WHEN the prize-winning paragraphs had been sifted out from the great mass of manuscripts submitted in the contest, and the awards of the judges were finally made, information was sought regarding the prize winners themselves, and there were more interesting developments as this information came to hand. For while the first prize went to a resident of Portland, Ore., in the far West, the second prize was awarded to the East, in the person of a Pittsburgh man; and these two winners were found to represent types of men almost as far asunder as their places of abode.

Walter W. Baker
Winner of First Prize

It needs only a glance at the respective portraits of Messrs. Baker and Dunning to show wherein they differ. The face of the first prize winner is that of a typical out-of-doors man, a lover of the sports of the field, with an adventurous spirit of the pioneer kind—and one is not surprised to learn that Mr. Baker, though by birth a New Yorker, obtained the inspiration for his winning idea from actual hunting experiences in northern India, where he acted as a government interpreter. Later he traveled throughout the Orient as publicity manager for an amusement enterprise, which he left in Colombo, Ceylon, returning to the United States and taking up his residence three years ago in Portland, where he is now employed by a shipbuilding concern.

The second-prize winner, on the other hand, is essentially a student. Son and grandson of Methodist ministers, Mr. Dunning has spent his years since graduation as an instructor, specializing in physics. In 1910 he received the master of arts degree from his alma mater, Dickinson College, Pa., and is at present in charge of the physics department of the Peabody High School, one of the largest schools of Pittsburgh. He too has served under a government, having spent some time in educational work in Porto Rico for the United States. Mr. Dunning wrote his winning paragraph for the contest, he says, after several days of careful thought on the problem. He hesitated to send it in, doubting its chance of winning a prize, but finally decided to do so, and his letter was received just before the contest closed.

Charles C. Dunning
Winner of Second Prize

In selecting the winning paragraphs the three judges, without conferring on the matter, each selected Mr. Baker's paragraph as best. Two chose Mr. Dunning's paragraph for second place, and after some discussion, this choice was unanimous.

Mr. Freeman, upon his return from the European war zone, will, undoubtedly, be able to replace the paragraph as he first wrote it. His version, together with those of the two prize winners, will then be published for comparison by our readers.

This Angular Pier has been Erected for Pleasure Purposes at Redondo Beach, California, to Replace an Old Wooden Structure That was Battered to Pieces by the Waves Some Few Years Ago

PIER OF PECULIAR SHAPE BUILT IN CALIFORNIA

Within recent months a recreation pier of unusual form has been erected at Redondo Beach, Calif. It is of reinforced-concrete construction and built much like an open "V." Two diagonal piers, their approaches about 700 ft. apart, project 440 ft. seaward and there converge in a platform that is 200 ft. in width and 160 ft. deep. Erected on this cross pier, the extremity of which is 600 ft. from the shore, is a small sun pavilion and observation tower. The three outer sides of the platform—the base of the so-called "V"—serve as fishing decks, while a landing for pleasure boats extends for a short distance down the seaward side of one of the legs, near the point where it joins the cross pier. At regular intervals along both diagonals, which are 36 ft. wide, and across the shoreward side of the platform, are canopied benches. A continuous promenade, a little over one-half mile in length, is afforded by the shore frontage and pier. Beam and girder type of construction was followed throughout in designing the work. In length the concrete piles vary from 20 to 85 ft., while their diameters are from 20 in. to 2 ft. The structure was erected to replace an old wooden one, wrecked about three years ago during a severe storm.

SPRAY ATTACHMENT FOR BATHTUB FAUCET

A simple attachment for a bathtub faucet has been designed which produces a horizontal spray and so can be used instead of more expensive shower-bath equipment, or in shampooing the hair. It consists of a metal cap, perforated at one side, and provided at one end with a rubber ball. An opening in this ball permits it to be fitted tightly over the spigot. The article should prove a great convenience to travelers.

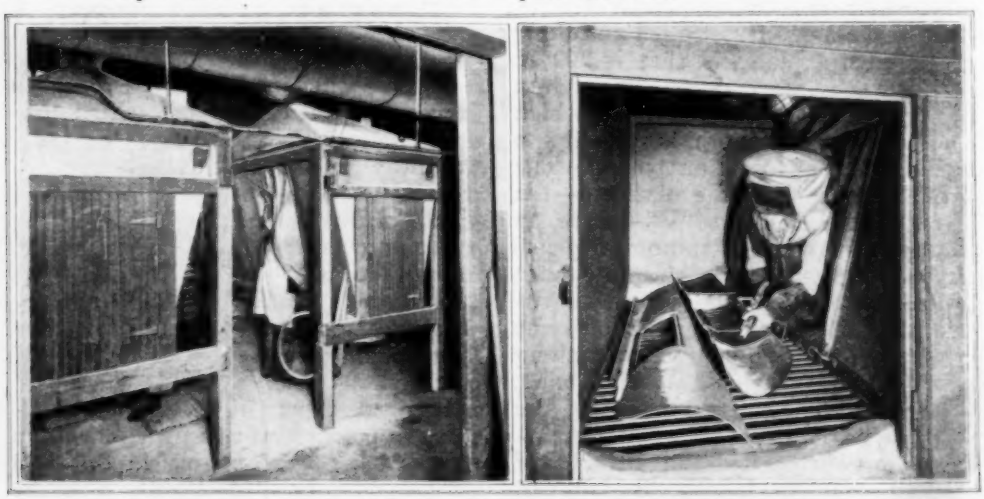
SAFETY IN SAND-BLASTING THROUGH NEW DEVICE

In factories where metal parts are treated with a sand blast in order to produce a smooth surface for painting, as in automobile factories, it has been found difficult to induce the workmen to persist in the use of the safety helmets and other devices adopted. A new method compels the operator to don a safety helmet or he cannot work at all. This is done by placing the sand-blast work in a compartment of the double-hopper type, while the workman stands outside. The compartment has two doors, one of the ordinary type through which the material is placed inside, and another formed of two sliding metal panels with a canvas curtain hung between them. The operator's safety helmet is made integral with the curtain, so that he cannot see the material inside or work upon it unless he puts his head in the helmet. The parts to be sand-blasted, such as automobile fenders, hoods, and even bodies, are laid on a metal grating in the hopper, under a strong current of air which draws off the finer particles of sand through the top of the hopper, the coarse grains falling to the bottom to be used again. The operator can move along as he works by pushing the sliding doors with his elbows. He sees his work through a fine copper gauze, which is kept clear of sand by the strong suction of air in the hopper. A battery of 12 of these hoppers is installed in one Detroit automobile factory.

In This Old Method of Sand-Blasting the Workman can Lay Aside the Safety Helmet When He Chooses and Still Do the Work, Though at the Peril of His Health through Inhaling Particles of Sand

---

¶An alloy of two per cent palladium with silver is said to form a good substitute for platinum in contact and spark devices.



Improved Method of Sand-Blasting, Which Compels the Workman to Don the Safety Helmet to Get at the Work inside the Hopper: He Stands Outside, as Seen at the Left, with Head and Arms Protected Inside, as Shown at the Right

PHOTOGRAPHS AS BACKGROUNDS FOR MUSEUM GROUPS

The use of painted backgrounds for museum groups of mounted animals and birds has become so expensive that photographic backgrounds are being substituted with great success. The director of the Colorado Museum of Natural History, at Denver, originated the idea of using enlarged photographic transparencies as backgrounds for groups of birds and small mammals, and the idea is now being used also in several other institutions. The pictures are of magnificent mountain scenes, typical of the natural habitat of each group displayed.

Each glass transparency forms the back of an exhibit case and is either 26 by 36 or 52 by 36 in. in size. There are already more than 40 such backgrounds, nearly all of them enlarged from 5 by 7-in. negatives. The method of tinting the transparencies is peculiar, but was adopted after other methods were found to apply too much coloring or to produce streaked results. Ordinary tube oil colors are slightly diluted and are applied with the finger tip, which is first made smooth by rubbing it with fine sandpaper. It is desired not to paint the glass picture but only to tint it to resemble nature. Colors are never mixed, as that kills the brilliancy. White is never employed, as the ground glass at the back takes the place of that medium. Shades are obtained by increasing or decreasing the amount of color.

Either artificial or daylight may be used to illuminate the transparency from behind, but electric light is chosen because daylight is too fluctuating. The completed group is viewed by the light which is transmitted through the glass background. The cost of these transparencies is relatively small, that of the smaller size being but $8.50 each, when bought in half-dozen lots. Tinting approximates an additional $3 each. The completed groups, exclusive of the case, average about $50.

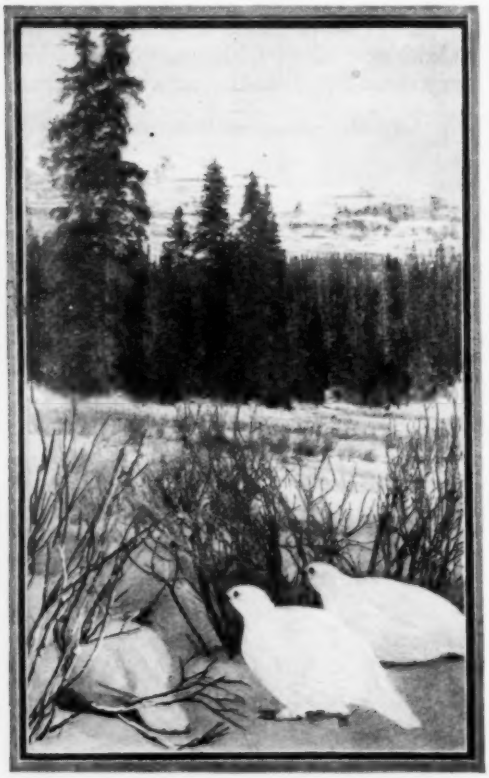
A second form of photographic background is employed for 110 groups in the Chicago Academy of Sciences. These are paper prints, 5 ft. high and 8 to 32 ft. long, enlarged from original negatives, ranging from 4 by 5 to 8 by 10 in. The pictures are taken in the neighborhood of Chicago, often of the very woods, streams, or valleys from

A Mounted Rat Group in the Colorado Museum of Natural History: The Background, with Its Fine Perspective, Is a Transparent Photograph

which the birds or mammals used in the groups were obtained. These backgrounds are absolutely accurate, contain much more fine detail than an artist could be expected to work into a hand-painted canvas, and cost approximately one-fifth of the latter.

Ordinary photographic paper, but of huge proportions, is used for the prints. Special large trays had to be made for developing and other processes, and six men are required to handle each print through the solutions in the trays, to prevent tearing. Each print is pasted upon muslin to strengthen it, and it is then mounted upon a sheet of galvanized iron to give it rigidity and

make it more nearly fireproof. The backgrounds are curved, when set in place within the exhibit cases, so that they cover the back and two sides of



A Photographic Transparency is Here Used to Show a Mounted Winter-Ptarmigan Group in Natural Surroundings

the cases. The mounted birds or small animals are so artfully arranged in front that, together with the natural material, as twigs, grass, and flowers, used in the foreground, they make the observer believe that he is viewing a real outdoor scene.

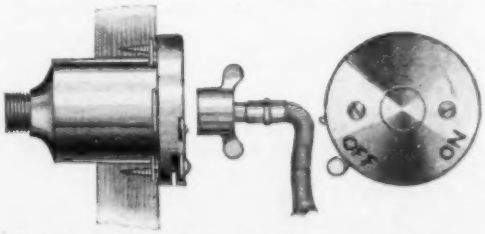
Each print is tinted by an artist using transparent oil colors, the work being done by artificial light similar to that under which the finished pictures will be displayed. The groups are viewed by reflected light, the electric bulbs being set in a row out of sight above the top of the front of each case. When photographs of the completed groups are desired for illustrative purposes they are made by a ten-minute exposure to the indirect light within the cases.

RIVAL OF POTATO FOUND IN TROPICAL TUBER

Since the much-complained-of high prices have affected potatoes along with other food products, the cultivation of the dasheen, a tropical tuber which has been introduced into the South from Trinidad, will be watched with keen interest. The value of this vegetable, it is believed, will be as a crop supplemental to, rather than a substitute for, potatoes, since it matures some time later than potatoes. The edible portion of the plant consists of a large central corm and a number of small tubers clustering about it. It requires a frostless season of seven months and moist, sandy loam. According to the Department of Agriculture it can be grown as far north as South Carolina. Its food value is comparable with that of the potato, but it contains less water and a greater proportion of protein, starch, and sugar. It can be prepared for table use as potatoes are.

SAFE GAS CONNECTION FOR HOUSEHOLD USE

One of the new devices relied upon by gas men to meet the growing competition of electricity in the home is a system of connecting portable gas appliances which is claimed to be safer than anything yet available in the market. Its basis is a concealing fixture or plate designed as a gas outlet for baseboard, wall, or floor. The union which is a part of the system will also connect to any ordinary gas cock or fixture by means of special



Details of a New Concealing System for Connecting Portable Gas Appliances in the Home

adaptor fittings. One size only is made and the parts are interchangeable, con-

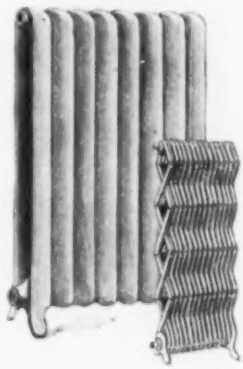
sisting of housing, cock, cover, and union. The housing has lugs for screwing to baseboard or wall, where the fixture is inconspicuous. Notches in the cover plate hold the operating lever in "on" or "off" position. When the gas is "off" and the union is removed, a spring on the plug locks the cock by preventing it from rotating.

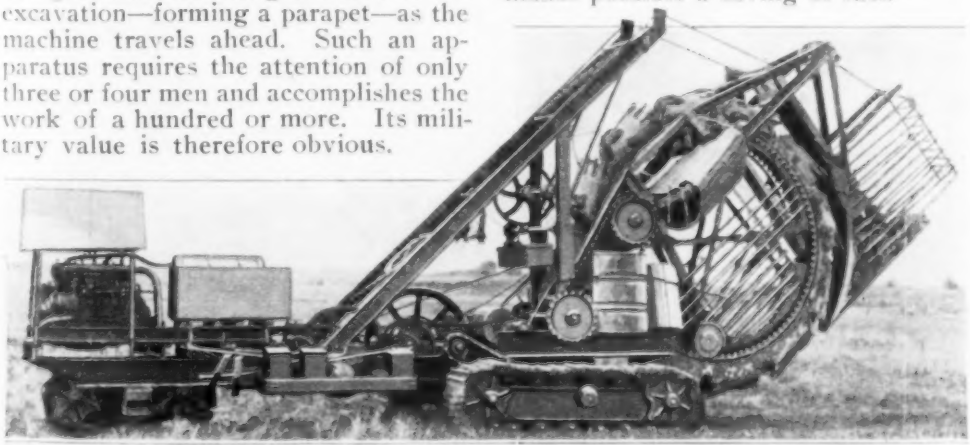
AMERICAN DITCH DIGGERS CUT BATTLE TRENCHES

Among the various types of trench diggers employed on the battle fields by Germany and its allies is a big machine of American manufacture which before the war probably was used for cutting drainage ditches or making excavations for pipes and conduits. It is of the same general character as some of those used in many of our own cities for more peaceful purposes. Caterpillar treads enable it to negotiate fairly soft fields in spite of its heavy weight, and when working without interruption it is able to dig a trench of considerable depth at the rate of about 370 ft. an hour, or almost a mile between sunrise and sunset. It is equipped with the usual series of buckets about the circumference of a big revolving wheel and is operated by a gas engine mounted at the front end. The buckets are dumped as they reach the top, the dirt falling onto a belt conveyor and being distributed along one side of the excavation—forming a parapet—as the machine travels ahead. Such an apparatus requires the attention of only three or four men and accomplishes the work of a hundred or more. Its military value is therefore obvious.

FRENCH RADIATOR BUILT ON NEW LINES

A French concern has recently placed on the market a new type of radiator especially adapted to hot-water heating systems, which is much smaller than ordinary radiators and, in proportion to its size, gives off more heat. It is made of several coils, or sections, in the usual way. They are, however, wider from front to back than common coils, and so shaped that the sides of the radiator as a whole are marked by deep horizontal depressions. Extending diagonally from front to back are a series of partitions between the coils which serve to throw the warmed air out into the room instead of allowing it to rise straight up. The result of this arrangement is that the upper portion of the radiator is surrounded by air that is no warmer than that around the lower portion, and so its entire surface is put to use to heat the maximum amount of cool air. This form of construction, it is claimed, makes possible a saving of fuel.

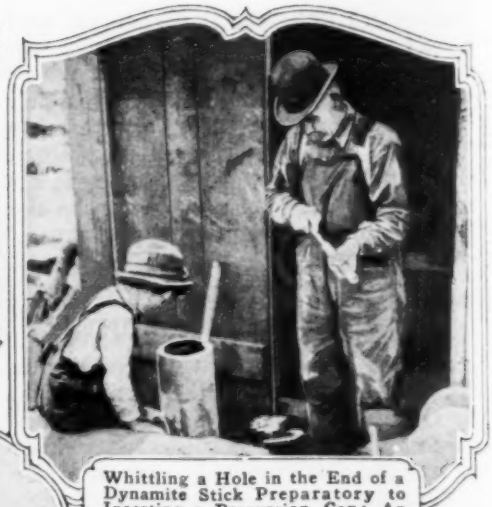




Big Ditching Engines of This American Type are Used by the Germans in Constructing Intrenchments along the Various Battle Fronts

DYNAMITE AND DREDGING BUCKET TEAR HOLE

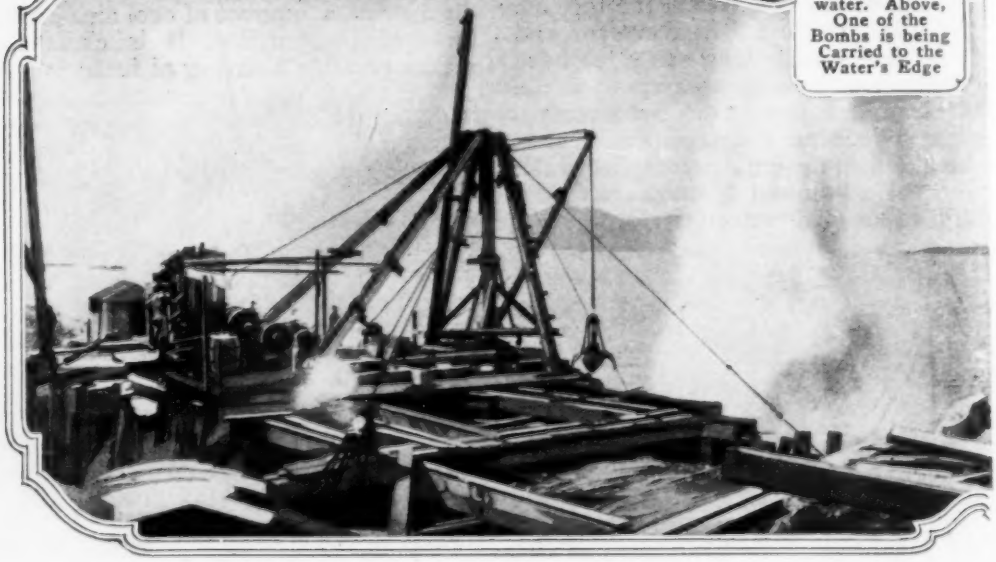
Thawing and Drying Dynamite before an Open Fire and, as a Correspondent Observes: "Carelessly Smoking a Cigarette over It." Incidentally Dynamite Burns without Exploding



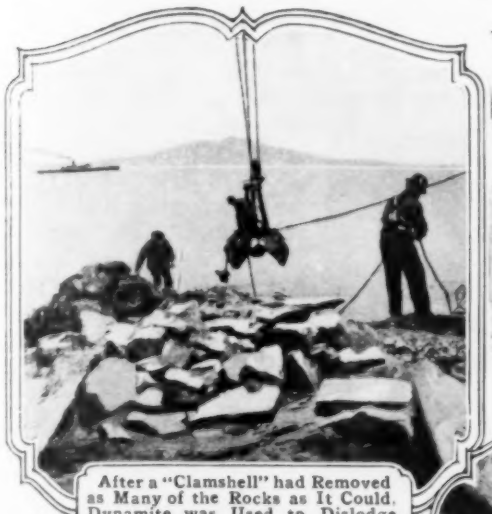
Whittling a Hole in the End of a Dynamite Stick Preparatory to Inserting a Percussion Cap: An Operation That Curdles the Blood of the Inexperienced, but Which Is Really Not Dangerous at All

A Section of Sewer Pipe and Plenty of Dynamite Makes a Good Bomb. The Blasting was Done for the Purpose of Making an Opening in a Stone Breakwater at San Francisco through Which a Large Storm Sewer was to Reach the Bay

The Sewer Extends for a Mile across a Shallow Bayou to the Breakwater. Above, One of the Bombs is being Carried to the Water's Edge



THROUGH BREAKWATER FOR PASSAGE OF SEWER

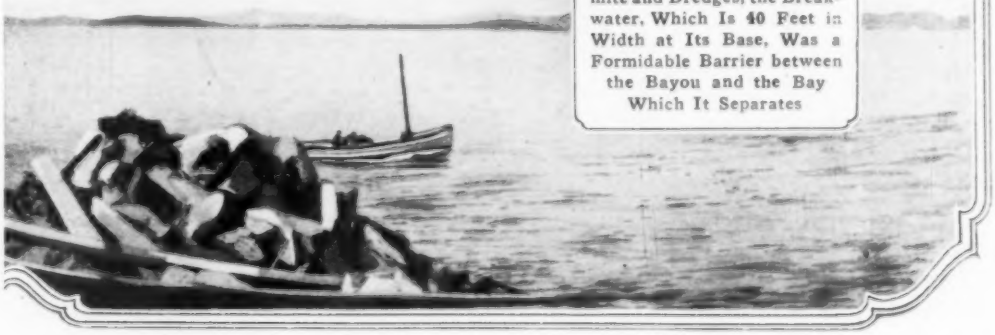


After a "Clamshell" had Removed as Many of the Rocks as It Could, Dynamite was Used to Dislodge Those below the Water. Here an Operator, Clinging to the Dredger Bucket, Is Lowering a Bomb

A Spout of Water Shot Far into the Air Following the Detonation 20 Feet below the Surface. This Loosened and Broke the Rocks so That They could be Grappled by the Dredger

After Enough of the Rocks had been Removed to Permit It, Steel-Pointed Piles were Driven to Form a Foundation. The Conduit Is 10 Feet in Diameter and Drains the Hilly Sections of San Francisco's North Side

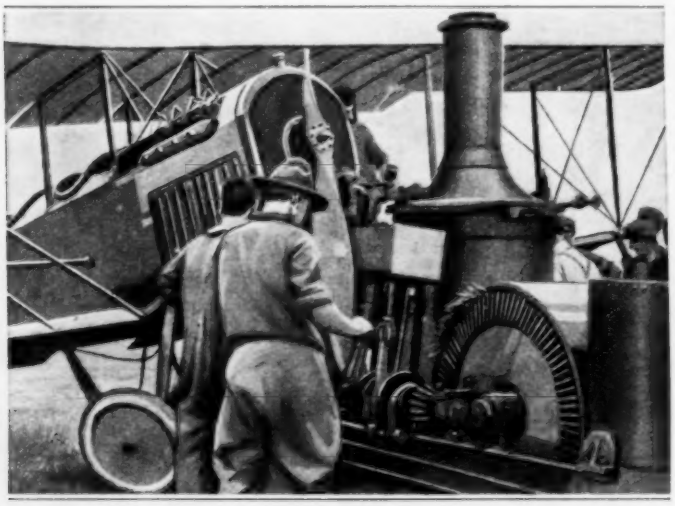
For a Minute or More the Water Boiled as If It were Heated by a Mighty Furnace. After That the Fishing for Rocks with the "Clamshell" was Started



The Site of the Work, a General View Taken at the Instant a Bomb Exploded, Lifting the Water High into the Air. In Spite of Dynamite and Dredges, the Breakwater, Which Is 40 Feet in Width at Its Base, Was a Formidable Barrier between the Bayou and the Bay Which It Separates

FLYING MACHINE AND STEAM ROLLER IN COLLISION

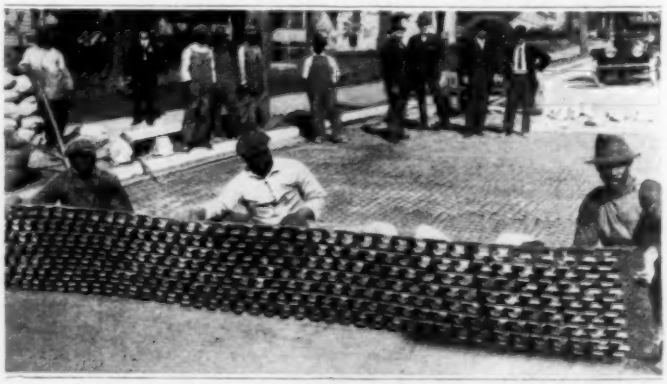
One would imagine it to be safe, in preparing a list of improbabilities, to include such a thing as a collision between an aeroplane and a steam roller. A rear-end crash of two so utterly different machines seems extremely incongruous. And yet this is precisely what occurred not long ago at an aviation field near Buffalo. The steam roller was being used on the turf when an airman attempted to make a landing. In doing this he either miscalculated the relative positions of his craft and the heavy roller, or became "object struck," for the nose of the plane was plunged with considerable force against the rear of the other machine. Fortunately no one was badly injured, but the propeller of the air craft was broken, the landing gear wrenched, and the radiator smashed.



One of the Unexpected Things That Happened: A Rear-End Collision of an Aeroplane and a Steam Roller

PRESSED-STEEL SURFACE FOR STREET PAVING

In repaving a street in Charlotte, N. C., recently a surface of steel sheets was laid as an experiment, according to a method invented by a civil engineer of Hammondsport, N. Y. The usual foundation of macadam having been provided, the roadway was overlaid with soft concrete and sheets of pressed steel were then placed upon the concrete and sunk in, making practically a steel road. The sheets were cut and pressed in such a way that tabs protruded on the under side and held the steel surfacing fast in the concrete. The roadway was completed in a shorter time than it usually takes for similar jobs of paving. The test is reported to have been a perfect success. When the concrete hardened it held firmly the new pavement and was not affected by several weeks of freezing weather which soon followed. Other cities are interested in the experiment.



Laying a Steel Pavement on a Street in Charlotte, North Carolina: The Workmen in the Foreground Are About to Place the Pressed-Steel Sheet on Its Bed of Soft Concrete. A Completed Surface is Seen behind Them

The Native "Sculptor's" Monkeys That Hear No Evil, See No Evil, Speak No Evil
These Dogs and Horses were Molded in Common Texas Mud and Baked in the Sun
Screw Tail, Bench Legs, Erect Ears, Good Marks, and All

"Doc Mud," His Unceasing Grin, and One of His Half-Finished Mud Horses, All Texas Products. "Doc Mud" Stops at Nothing; Even Trees and Wild Animals are Molded, as Shown at the Right

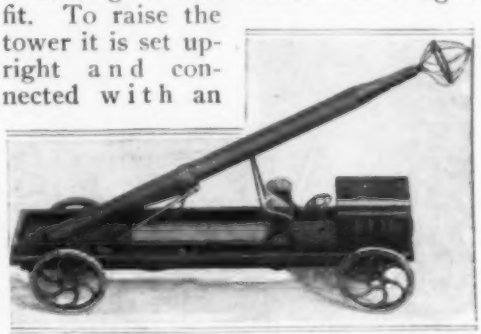
SCULPTOR IN MUD IS NEGRO DOCTOR OF HORSES

While traveling through the blackland district of Texas some time ago, a correspondent, who happened to make a stop at a typical negro cabin, was surprised to find a grinning darky engaged in molding a miniature horse from ebony-colored mud taken from the roadway in front of his shanty. He found that the fellow—a horse doctor by calling—was in fact quite a clever, although totally untrained, "sculptor." Images of dogs, monkeys, pigs, opossums, and other animals, had been fashioned by him in the mud, baked in the sun, and painted in fairly natural colors. Especially good were some of the dogs and monkeys he had molded. In making the former, he had shown considerable appreciation of some of the characteristic postures assumed by hunting dogs and terriers. Among the natives the fellow is known as "Doc Mud."

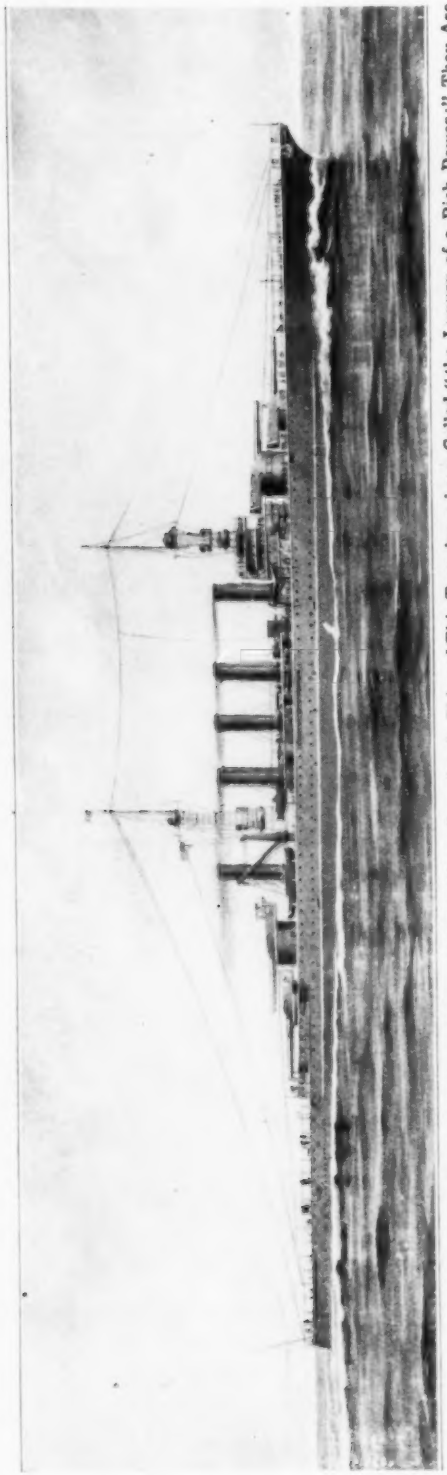
¶ The Bureau of Lighthouses has found by experimenting that at a cost of $150 a pressed-glass lens for buoys can be made, which is as serviceable as the cut-glass lenses, which cost $250 more.

WIRELESS TOWER ERECTED WITH COMPRESSED AIR

Plans for a pneumatically operated portable tower for a wireless outfit have been presented by the inventor to the War Department at Washington. The tower is mounted on an army truck and consists of a series of thin steel tubes which telescope into one another so that when the device is collapsed it is only 10 ft. long. Leather washers give these sections an air-tight fit. To raise the tower it is set upright and connected with an engine which pumps compressed air into it. In less than a minute it can be extended to its full height of 100 ft. It can be lowered even more quickly.



Portable Telescoping Tower for a Wireless Outfit: It can be Extended in Less than a Minute by Pumping Compressed Air into It



How the New Battle Cruisers of the United States Navy will Look When Completed: Ships of This Type have been Called "the Luxury of a Rich Power;" They Are Larger and Much Faster than Battleships, Mount Guns Almost as Heavy, and Cost More. Four of Them are Included in the Naval Building Program for This Year

BATTLE-CRUISER DESIGNS ARE COMPLETED

Designs for the new battle cruisers of the United States Navy were completed recently and indicate that they will be indeed magnificent craft. Four of them were appropriated for in the naval bill for 1917 and six in all will be laid down under the three-year building program of the navy. They will be larger and more expensive than the latest battleships, having a length of 850 ft. and an enormous horsepower, calculated to give them a speed of 40.3 miles an hour, or about 16 miles faster than the battleships.

MAY EMPTY IDLE CANALS AND USE THEM FOR CARS

A number of cities in the United States seem to be in a fair way of finding a use for the old, insanitary canals which pass through their midst, taking up valuable space, acting as open sewers, and rendering little or no service because the boat traffic on them is negligible. In Cincinnati it is proposed to utilize a portion of the bed of the Miami and Erie Canal for an interurban route. It is said that in Syracuse the old Erie Canal bed will eventually become the route of the New York Central tracks, and a similar change has been projected for Rochester, N. Y., in which case the canal at that point would be turned into a new channel and the old one used for street-car tracks.

WHIRLING "TANGO GIRL" IS NEW AMUSEMENT DEVICE

In response to the constant demand for amusement devices that offer pleasure seekers new thrills, there has been constructed in a Cincinnati amusement park a new "ride," called the "tango girl." It represents a huge female figure having a skirt that spreads out like a big circular tent. The edge of the skirt is surrounded with a platform having seats for 80 persons.

Huge Figure Called the "Tango Girl" Which Sways Its Patrons from Side to Side and Whirls Them Around as It Moves down the Track

Within the figure is electrical machinery which drives it along a broad track. As it runs down this track, special apparatus is employed to tilt the figure from side to side and occasionally give it an exciting whirl, much to the merriment of those on the edge of the outspread skirt.

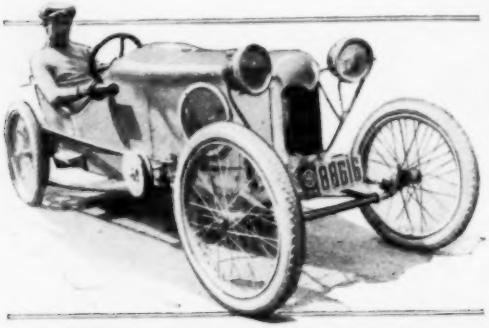
CONVENIENT HOLDER FOR NURSING BOTTLES

A patent has been granted recently for a nursing-bottle holder which is a great convenience to one caring for a child that is being raised on a bottle. The device consists simply of an adjustable wire framework which can be quickly fitted about bottles of various sizes. It has two loops placed at one side which hook onto a strap or cord so stretched across a crib, or baby cab, that the bottle is within the child's reach. When the baby has finished nursing or drops off to sleep, the bottle remains fastened to the cord, instead of falling to one side and being broken or partly emptied of its contents. By using this simple device it is unnecessary for a mother to remain close by a child while it nurses, nor is it necessary to pick up the bottle repeatedly after the baby drops it. When the bottle is to be washed the holder can be easily removed.

A Wire Holder Which Fits about a Nursing Bottle so That It can be Hung from a Strap within Easy Reach of a Baby in a Crib or Cab

LARGE ROUND VENTILATORS IN SIDES OF AUTO HOOD

A novel feature in motor-car designing is to be found in the automobile of a Cincinnati motorist who has cut a



Circular, Screened Ventilators in the Sides of the Engine Hood Give This Car an Unusual Appearance

large circular opening in each side of the engine hood, in place of the usual ventilators. These apertures are covered with fine screening which keeps out most of the dust. When the machine is driven at high speed the large volume of air that rushes through the screens helps materially to keep the engine cool. The car is of the racing type, with a low body, and the circular ventilators give it an unusual and distinctive appearance emphasized by the absence of mud guards.

VULCANIZER THAT CAN BE USED AT THE ROADSIDE

Among the advantages possessed by a vulcanizer now on the market are that

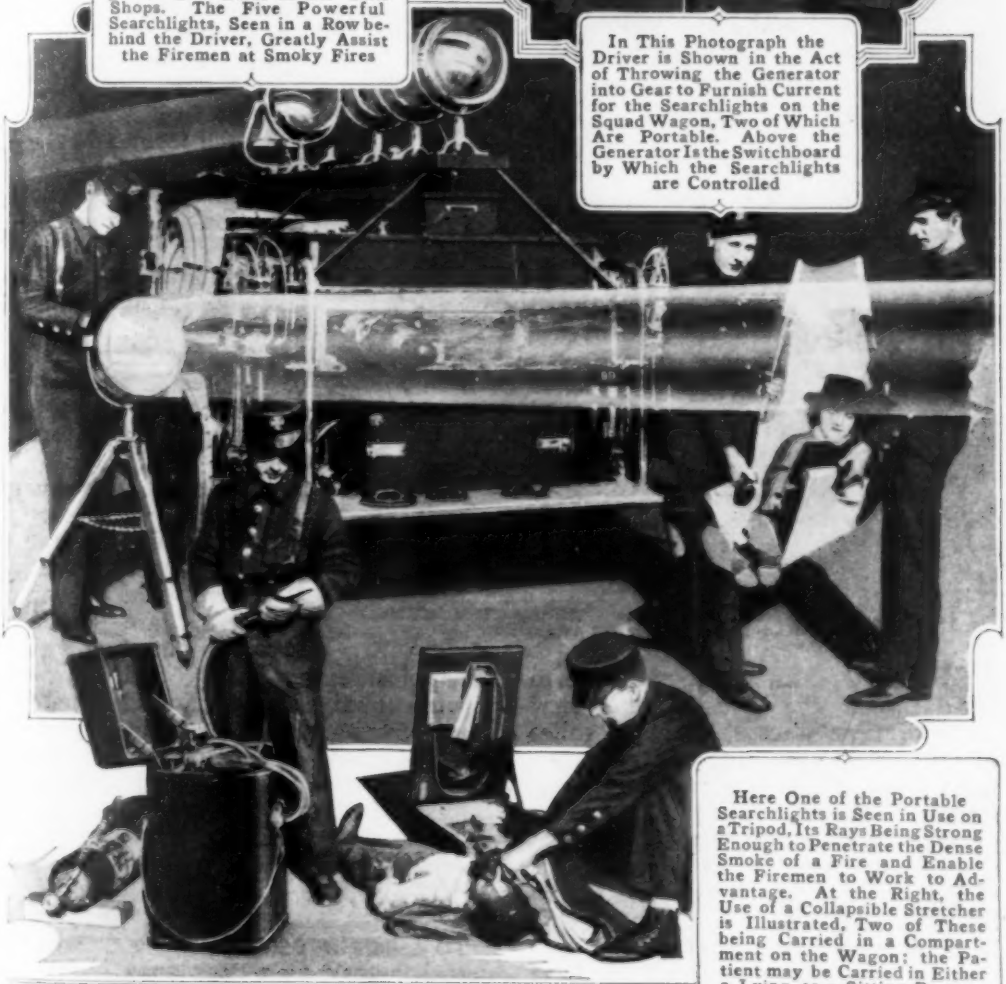
it occupies comparatively little space, can be operated out of doors in the wind, adjusts itself to rubber of various thicknesses, and is self-locking. The vulcanizer resembles a seal press in its construction. The rubber to be repaired is pressed between an adjustable bottom plate and a flat-bottom oil cup. The latter is raised and lowered by a lever which holds the cup firmly in whatever position it is placed. The cup is heated by oil burned within it, and is covered with a perforated cap which prevents the flame from being blown out by the wind. The device operates quickly and will vulcanize patches of various thicknesses equally well.

FIRE-DEPARTMENT WAGON WITH MANY USES

A recent addition to the equipment of the fire department in Los Angeles, Calif., is a motor car called a "squad wagon," built in the department shops, and unusual in the completeness of its equipment. It has five powerful searchlights, used to assist the firemen in their work by penetrating smoke and darkness. Two of these lights are portable, connected to a reel of 300 ft. of wire, and can be carried into a burning building to that distance. These portable lights are provided with tripods, enabling them to be used in the manner shown in the photograph. The car carries storage batteries capable of furnishing light for seven hours, and a generator of sufficient power to run all the lights. The generator is run off the main drive shaft, with a separate clutch and silent-chain drive. A switchboard is conveniently placed over the generator and the lights can be operated separately or all together, as required. A portable oxyacetylene outfit for cutting metal; a pulmotor for reviving firemen, or others, overcome by gas or injury; two smoke helmets, which enable firemen to work in places dangerously filled with smoke or gas, stretchers, and numerous other appliances and tools useful in emergencies, are carried on the car, together with a reserve supply of gasoline for the fire engines, extra sections of hose, large and small nozzles, and an assortment of increasers and reducers, all being readily accessible on this well-equipped squad wagon.

New Squad Wagon of the Los Angeles Fire Department Starting on a Run: The Car was Designed by a Department Engineer and Built in Its Own Shops. The Five Powerful Searchlights, Seen in a Row behind the Driver, Greatly Assist the Firemen at Smoky Fires

In This Photograph the Driver is Shown in the Act of Throwing the Generator into Gear to Furnish Current for the Searchlights on the Squad Wagon, Two of Which Are Portable. Above the Generator Is the Switchboard by Which the Searchlights are Controlled

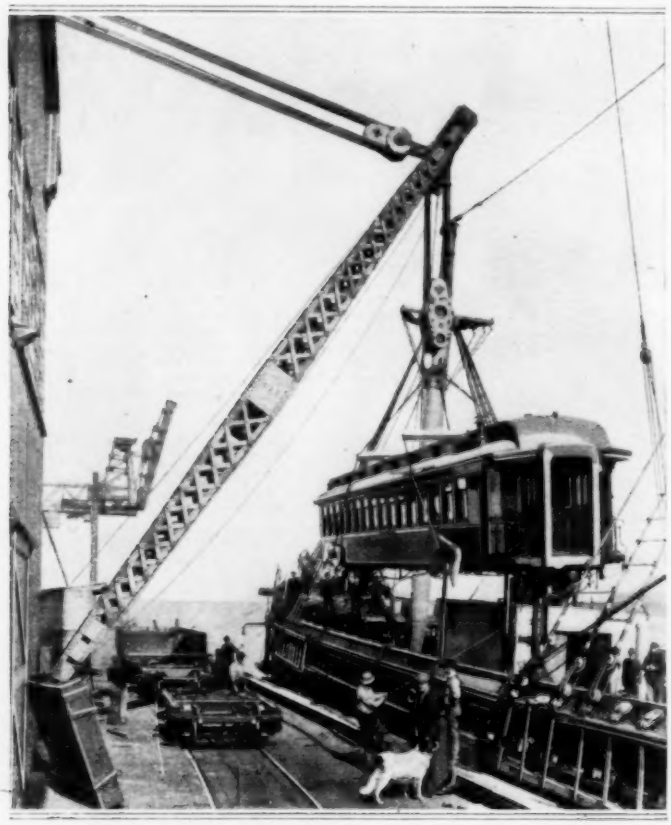


Here One of the Portable Searchlights is Seen in Use on a Tripod, Its Rays Being Strong Enough to Penetrate the Dense Smoke of a Fire and Enable the Firemen to Work to Advantage. At the Right, the Use of a Collapsible Stretcher is Illustrated, Two of These being Carried in a Compartment on the Wagon; the Patient may be Carried in Either a Lying or a Sitting Posture. A Trained Nurse Is a Member of Each Crew

At the Left Is the Oxyacetylene Apparatus with Which the Squad Wagon is Equipped for Cutting through Metals When Necessary at Fires. At the Right a Fireman is Using the Pulmotor to Induce Respiration and Restore Consciousness in a Person Overcome by Smoke

CARS FOR ALASKAN ROADS SHIPPED FROM SEATTLE

Before the close of the shipping season railway passenger cars were loaded aboard a steamer at Seattle and shipped to Alaska, where they are to be used on the government's new transportation lines. About 85 miles of the latter, extending in two directions from Anchorage, has been constructed. When completed 1,000 miles of new trackage will connect Cordova and Fairbanks as well as the coal fields of the Kuskokwim River district with Susitna and Seward. Linking existing lines, this network will open a section of the country which is rich in natural resources. The late shipment of cars foreshadows another of America's important engineering victories.



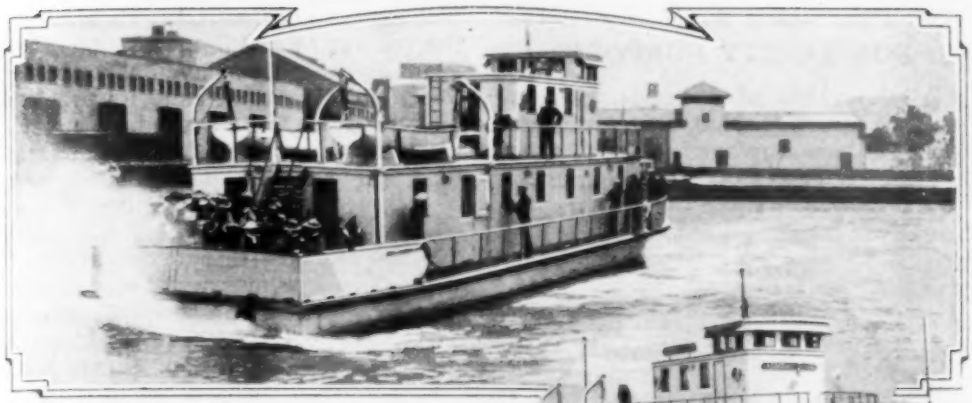
Passenger Cars for the Government's New Railway Lines in Alaska being Loaded onto Steamer at Seattle

HOW BUREAU OF MARKETS IS AIDING FARMERS

The secretary of agriculture in his recent report points out that in the three and one-half years in which the Office of Markets and Rural Organization has been in existence it has rendered many important services in the matters of marketing farm produce and of rural finance, and in other agricultural questions. For example, an organization of co-operative fruit growers, corporations, and individual fruit growers has been formed in the Northwest, which aims to secure broader distribution of its products by establishing uniform grades of fruit, and uniform marketing methods. The office has also issued systems of well-tested accounts and records for primary grain elevators and live-stock shipping associations. Systems are being tested for country creameries and cotton warehouses. Monthly cold-storage reports are issued showing the holdings of apples, eggs, butter, and cheese throughout the country, together with comparisons with the previous year. The secretary recommends that the name of the office be changed to Bureau of Markets.

NAVY BUILDS STURDY FERRY FOR GOAT ISLAND TRIPS

To take the place of the somewhat unsatisfactory open-deck tugs heretofore plying between San Francisco and the Goat Island naval training station, the Navy Department has designed



Both at Its Bow and Blunt Stern, the "Admiral Glass" Has Generous Deck Space

and recently placed in service an odd little ferry known as the "Admiral Glass." From its stern the vessel has the appearance of a river house boat, but the bow view shows it as quite trim, although a bit unusual in some respects. With a length of 85 ft. it has a 20-ft. beam and 3½-ft. draft. Twin screws are mounted at its square stern and driven by two gasoline engines which give the craft a speed of slightly more than 10 miles an hour. Four-foot passageways extend on either side of the deckhouse, which is fitted with lateral seats. The little craft can carry about 300 passengers, and it is thought that it has freeboard and housing enough for comfort in rough weather, and sufficient deck space fore and aft for ordinary needs when the water is smooth. It is stanchly built and considered quite seaworthy.

The Odd Little Ferry That Now Plies between San Francisco and the Naval Training Station at Goat Island

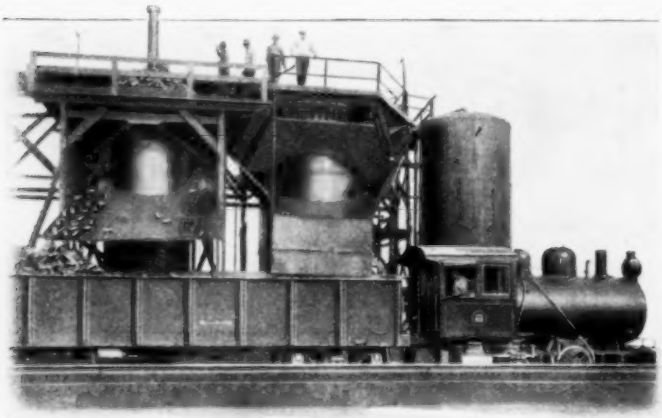
FIFTEEN ACRES OF DAISIES UNWELCOME FLOWER BED

Despite the fact that we buy them by the dozen in the cities, paying a dollar or so for a small bouquet, daisies are a menace to the agriculturist, and a patch or field of them is anything but welcome. A Nebraska farmer, near Beatrice, who wished to obtain a good stand of Kentucky blue grass in his pasture, last season instructed a well-known mail-order house to ship him several bushels of seed. He prepared 15 acres of land and planted it, exercising particular care. The spring rains came, and following them 15 acres of yellow-centered daisies, a luxuriant crop. The unusual sight attracted motorists from miles around and hardly a day passed without parties stopping to pick armloads of the blossoms. It is not clear how the mistake occurred, but mistake—and a serious one—it was. The company, needless to say, promptly made restitution so that the farmer in the end got a liberal return for his unexpected and undesired crop.

Daisies, Millions of Them, Covered the Pasture Sown to "Blue Grass"

USE FIRELESS STEAM ENGINE FOR SAFETY PURPOSES

In the yards of a wood-preserving plant at Orrville, Ohio, a fireless steam locomotive is employed as a safeguard against conflagrations. The engine is interesting not only because it is of unfamiliar type, but on account of the fact that one of the first of its kind was the subject of much speculation a few years ago when displayed at an Italian exposition. At that time its practicability had yet to be proved. The locomotive does not generate the steam it uses, for its main part consists of a large cylinder—instead of a fire box and boiler—that holds a sufficient quantity of steam under heavy pressure for eight or more hours of operation. Steam is developed at a power plant and pumped into the reservoir before the beginning of the day's work. The piston cylinders are placed at the rear beneath the cab, instead of at the front of the engine, for the purpose of balance. The locomotive in the yards at Orrville weighs 22 tons and pulls about a dozen steel gondola cars, fully loaded.



Instead of being Generated by It, Steam is Pumped into This Engine under High Pressure and in Sufficient Volume to Permit Operation for an Entire Day

SWINGING BASKET IN MOTOR BABY'S CRIB ON TOUR

Born while its parents were on a cross-country tour, a Chicago baby has the distinction of having become a motorist at the age of two weeks and of making a trip of several thousand miles in an open car without so much as a whimper. Instead of abandoning their overland journey upon the child's birth, the parents continued it, making their way across desert, mountain, and plains to the Mississippi Valley region from the Pacific coast. Throughout this long tour the baby swung peacefully in a comfortable basket suspended in the tonneau from braces supporting the top. Each morning it had its bath at some cool stream or lake and a brief sunning while reposed on the top of a bowlder or stump.

When Two Weeks Old, This Baby Started on a Motor Trip of Several Thousand Miles with Its Parents, Riding in a Softly Lined Basket Suspended in the Tonneau

HEALING WOUNDS BY WASHING AND BY MATHEMATICS

By R. J. BJURSTEDT

UNDOUBTEDLY the most important medical discovery made during the war is that of Doctor Carrel, of the Rockefeller Institute, who, working at a hospital maintained by the institute at Compiègne—just behind the battle line in northern France—has perfected a method of sterilizing wounds, so efficacious that, of the hundreds of patients that have so far been treated by it, only one has died. And this one, it is interesting to know, did not succumb to the original shell wound in the back for which he was brought to the hospital, nor yet on account of the trachea and jugular which he severed with a hastily snatched surgical instrument in an attempt at suicide during a fit of madness, but to a violent attack of pneumonia induced by his exposing himself at an open window in the absence of his attendant.

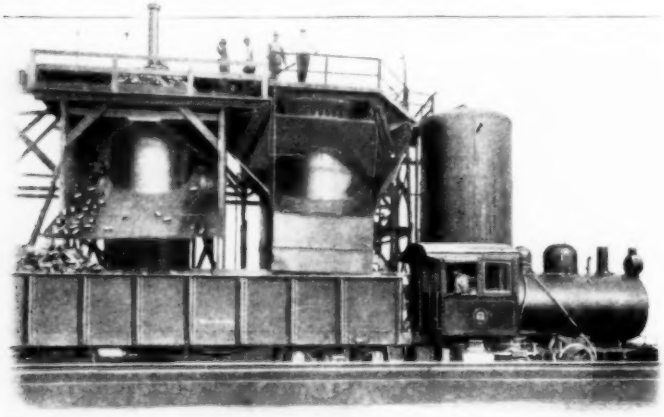
Pierre du Nouy, Who has Discovered a "Law of Cicatrization," Which Makes It Possible to Calculate the Exact Day upon Which a Wound will Heal

Nothing approaching perfect sterilization of any but the most superficial wounds had ever been effected from the time of the great pioneer, Doctor Lister, down to the beginning of the war, when the infliction of deep and terrible wounds at a rate many thousand times greater than through the ordinary accidents of peace time, made the need of such sterilization vital and immediate. It was to the discovery and perfection of some means of sterilizing wounds—and especially the yawning, lacerated tears left by shell fragments—that the genius of Doctor Carrel was directed. Working in time of peace, with nothing but dogs and cats and mice and guinea pigs to experiment with, the remarkable method which this distinguished surgeon and scientist has evolved might well have been imperfect at the end of many years; with real men—breathing, bleeding men—at his disposal in an endless stream, his object was practically accomplished before the first anniversary of the war came around. That is to say, the "Méthode Carrel" as practiced today was put in operation in the hospital maintained by the Rockefeller Institute under the supervision of the French Red Cross at Compiègne over a year ago; the interim has been employed in perfecting certain minor details, in bringing it to the attention of other hospitals, and in training visiting surgeons in the working of it. Among the latter, it is interesting to note in passing, has been the head of one of the great railway and smelter hospitals at Pueblo, Colo., who has made preparations to put the "Méthode Carrel" into operation there at the earliest possible moment.

To effect the complete sterilization of a wound Doctor Carrel came to the conclusion that it would be necessary to carry the antiseptic to all parts,

USE FIRELESS STEAM ENGINE FOR SAFETY PURPOSES

In the yards of a wood-preserving plant at Orrville, Ohio, a fireless steam locomotive is employed as a safeguard against conflagrations. The engine is interesting not only because it is of unfamiliar type, but on account of the fact that one of the first of its kind was the subject of much speculation a few years ago when displayed at an Italian exposition. At that time its practicability had yet to be proved. The locomotive does not generate the steam it uses, for its main part consists of a large cylinder—instead of a fire box and boiler—that holds a sufficient quantity of steam under heavy pressure for eight or more hours of operation. Steam is developed at a power plant and pumped into the reservoir before the beginning of the day's work. The piston cylinders are placed at the rear beneath the cab, instead of at the front of the engine, for the purpose of balance. The locomotive in the yards at Orrville weighs 22 tons and pulls about a dozen steel gondola cars, fully loaded.



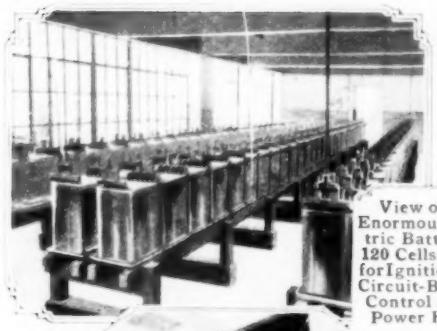
Instead of being Generated by It, Steam is Pumped into This Engine under High Pressure and in Sufficient Volume to Permit Operation for an Entire Day

SWINGING BASKET IN MOTOR BABY'S CRIB ON TOUR

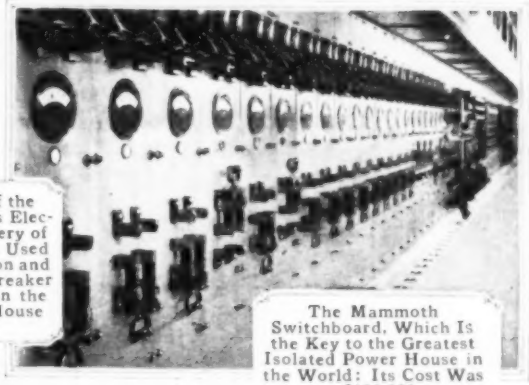
Born while its parents were on a cross-country tour, a Chicago baby has the distinction of having become a motorist at the age of two weeks and of making a trip of several thousand miles in an open car without so much as a whimper. Instead of abandoning their overland journey upon the child's birth, the parents continued it, making their way across desert, mountain, and plains to the Mississippi Valley region from the Pacific coast. Throughout this long tour the baby swung peacefully in a comfortable basket suspended in the tonneau from braces supporting the top. Each morning it had its bath at some cool stream or lake and a brief sunning while reposed on the top of a bowlder or stump.

When Two Weeks Old, This Baby Started on a Motor Trip of Several Thousand Miles with Its Parents, Riding in a Softly Lined Basket Suspended in the Tonneau

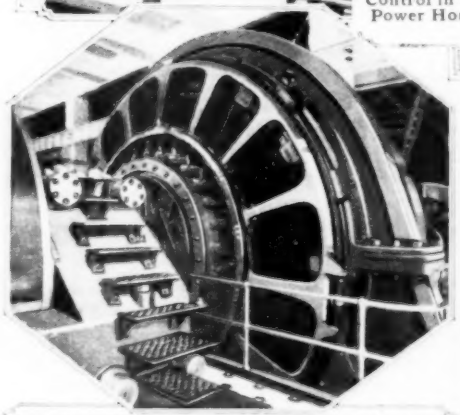
PAGES MISSING



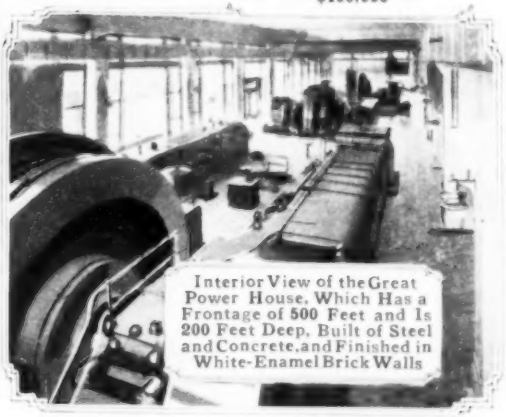
View of the Enormous Electric Battery of 120 Cells, Used for Ignition and Circuit-Breaker Control in the Power House



The Mammoth Switchboard, Which Is the Key to the Greatest Isolated Power House in the World: Its Cost Was $400,000



One of the Six Huge Electric Generators Installed in the New Power House of a Detroit Automobile Factory: They Are the Largest 250-Volt Machines of Their Kind Ever Built and Each of Them could Light More than 90,000 Tungsten Lamps

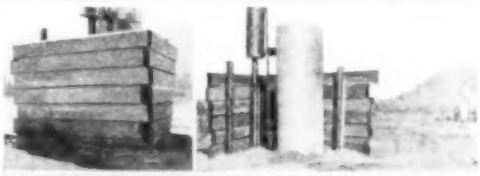


Interior View of the Great Power House, Which Has a Frontage of 500 Feet and Is 200 Feet Deep, Built of Steel and Concrete, and Finished in White-Enamel Brick Walls

carrying the armature is 34 in. in diameter. Such a generator could furnish current sufficient to light a city of more than 100,000 people. It weighs, including the shaft, 135 tons. The switchboard used for control of the plant is 424 ft. long, having 222 panels of Tennessee marble. The power which can be developed is equal to 45,000 hp. The power house is second in size only to that of the Krupp works in Germany. One of its features is the largest ignition battery in the world.

FLOOD PROTECTION FOR RIVER-BED WELLS

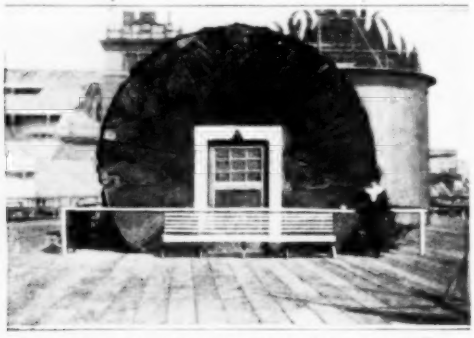
A series of 12 wells located in the bed of the San Diego River, Calif., is protected against flood damage by wedge-shaped structures of heavy timber and railroad iron, placed in front of each of the wells, with the nose of the wedge pointed upstream. While the river is dry in summer, it often becomes a torrent in the winter season, when the superstructure covering each well, with air-lift apparatus, is liable to be torn out by floating débris. In constructing the protecting wedges, three 30-lb. rails were first driven to a depth of about 24 ft. in the sands at each well, and the wedge was completed with heavy planks. Each wedge extends 6 ft. below the surface of the sand and 6 ft. above, thus forming a barrier against shifting sands as well as floating débris.



Timber Wedges Provided to Protect Wells in a Dry California River Bed against Flood Damage in Winter

AMUSEMENT-RESORT BOOTH MADE OF REDWOOD LOGS

At Venice, one of the popular seaside resorts of southern California, a concession booth has been constructed



This Queer-Looking Structure Consists of Two Massive Redwood Logs, Hollowed and Joined Together

from parts of a giant redwood tree. In order to transport them from the forest, two massive trunk segments had to be cut into sections, like a pie. These "slices," covered with the natural bark, were later assembled and the building erected by placing one of the hollowed logs on end and laying the other flat. The two were then connected and doorways provided.

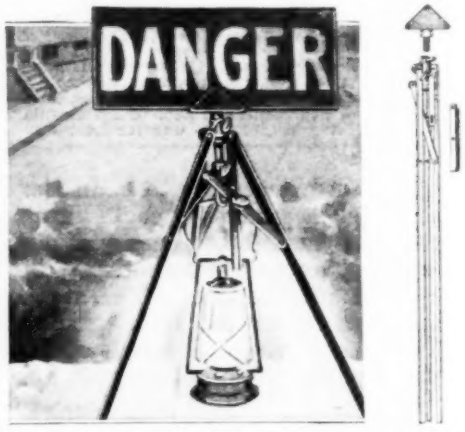
CLAMP FOR PAPER HANGER'S UNHANDY OUTFIT

Among the troubles of the paper hanger in the past has been that of carrying and keeping together his pasteboards, straightedge, and trestles. This is eliminated by a new clamp, or pair of clamps, with adjustable carrying straps, recently devised by a Chicago firm. Before applying the clamps for the first time the straightedge is laid longitudinally in the center of the boards, in the carrying position, and holes for bolts are bored 11 in. on either side from the middle, through boards and straightedge, so that the clamps when adjusted and bolted tight are 22 in. apart and the entire outfit, including trestles, is securely fastened together.

This Shows How the Paper Hanger's Outfit is Securely Fastened Together for Carrying with the New Clamp Bolted through the Boards

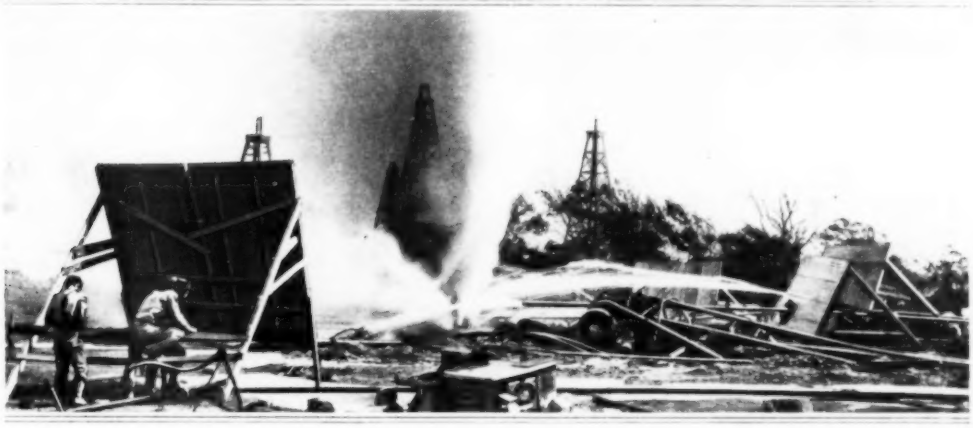
FOLDING STEEL STAND FOR SIGNAL LANTERNS

A folding steel lantern stand now being used by contractors, pavers, etc., is a big improvement over the makeshift supports which are commonly employed to hold lanterns that mark open ditches and the like. The stand somewhat resembles a camera tripod, and



Folding Steel Stand to Which a Sign and a Lantern can be Attached: The Lantern can be Locked to the Frame so That the Latter cannot be Folded Up

extending downward from its apex is a hook on which the lantern is hung. A steel arm is provided that can be inserted through the lantern frame and locked to the stand in such a way that the latter cannot be folded up, nor can the light be removed. This feature lessens the possibility of the device being stolen. At the upper end of the framework is a detachable plate to which a sign can be attached if desired, so that the stand can also be of use by day.



Fighting a Gas-Well Fire with Streams of Water Which are Directed from behind Hastily Erected Screens of Corrugated Iron

FIGHT GAS-WELL FIRE FROM BEHIND SCREENS

Many valuable holdings in the Goose Neck oil fields of Texas were seriously endangered recently when a gas well in the midst of several oil wells caught fire. Streams of water were directed toward the spouting flame and the surrounding ground was flooded, in the fight to gain control of the blaze. That the men might get close to the intensely hot fire, large shields, covered with corrugated iron, were hastily erected, and from behind these the streams of water were controlled.

DREDGE PROPELLED EIGHT MILES WITH ITS DIPPER

A dredge boat on the Mississippi River was bereft of its tug not long ago, and as its crew was anxious to get back to port the clumsy craft, which was without any regular propelling machinery, was drawn upstream eight miles by means of its dipper. The method employed was to run the dipper out to the end of its boom, lower it until it had sunk into the bed of the stream, and then draw the dredge forward a few feet, with the bucket serving as an anchor. By repeating this process again and again, slow but steady progress was made, and the destination was reached after eight hours of labor.

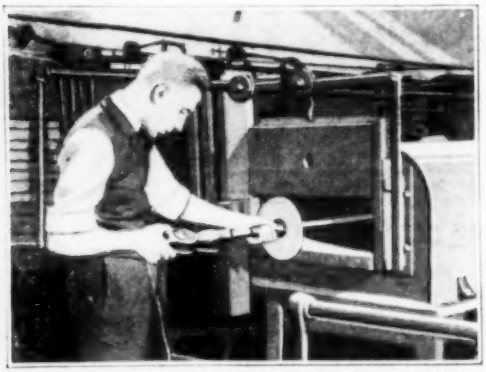
SMALL SHACKS ON RUNNERS USED BY ICE FISHERMEN

Fishing through the ice is one of the sports enjoyed in midwinter by the farmers in the lake region of the north woods. Instead of erecting a canvas screen to shelter them from the wind and cold, they usually construct a small shanty and attach runners to one side of it so that it can be tipped onto them and moved from place to place with the aid of a horse.

When Fishing Grounds are Changed, the Cabin is Tipped onto the Runners and Hitched to a Horse

INDICATOR SIMPLIFIES TESTING OF STEEL

A new device for determining when the critical point has been reached in the heat treatment of steel simplifies a process which in some instances has required the use of special laboratory apparatus and the services of skilled men. What is called the critical point is arrived at by raising the temperature of a steel furnace until a chemical combination takes place between the iron and the carbon which are being heated. When this critical point is reached the steel loses the magnetism which it formerly possessed. It is this phenomenon that is taken advantage of when using the new testing device. The instrument consists of a long rod, electrically connected with a transformer, and having at one end magnetic coils which are inserted into the furnace so that a contact is made with the steel. The rod is provided with a magnetic indicator near its handle end. When this member shows that the steel has become entirely nonmagnetic then the workman using the testing device knows that the critical point has been reached and can regulate further treatment accordingly.



A Device Which Indicates When the Critical Point has been Reached in the Heat Treatment of Steel by Testing It for Its Magnetism

MILLS BUILD LARGE DAM TO INSURE WATER SUPPLY

Storage capacity of the west branch of the Penobscot River in Maine has been immensely increased by the construction of a 700-ft. solid-concrete dam by a paper company to insure a sufficient supply of water for its pulp and paper plants at Millinocket. The new dam replaces an old wooden structure and is 92 ft. in extreme height. It creates a storage lake, or reservoir, some 40 square miles in area, and is situated at the head of the Ripogenus Gorge, the outlet of a lake of that name. This is an ideal location for a dam, lying between two mountains. Water is raised at the new dam 60 ft. above its former height, which was about 20 feet over the normal lake surface. Seven former lakes and ponds have been eliminated in forming the new storage lake, which when filled is expected to guarantee an ample water supply for the mills during a two-year period of slight rains. The dam is 64 ft. thick at its base, and has a 16-ft. roadway on top. There are four deep-water gates, 9 by 12 ft., for use in regulating the flow of water. These are operated electrically.

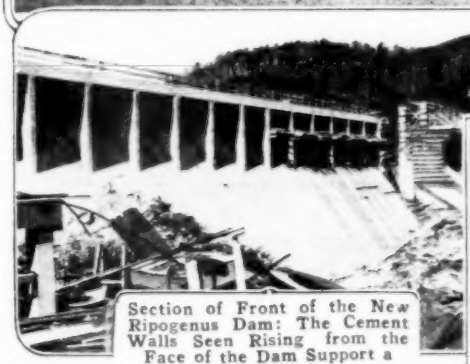
Many million feet of logs are driven down the Penobscot River each season, and provision is made for handling these at the dam by means of a sluice at the eastern end. This sluice is of solid concrete, 450 ft. long, with a drop of about 25 degrees.

The greatest problem which confronted the engineers in this work was that of getting material and supplies to the dam site, which is 46 miles from the nearest railroad station, including 15 miles of water transportation by ferry. Freight carriage over the 31 miles of rough "tote" road was $10 a ton, and before any work was done on the dam the engineers built a good macadam road to bring in material by motor trucks and so lessen the freight charges. The road cost the company $250,000, but reduced freight expense to $2 a ton. Every paper mill and sawmill in the vicinity, of which there are about 20, will be benefited by the new road and the new dam.

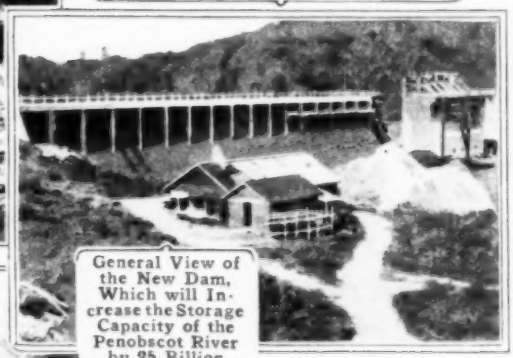
Snubbing One of the Big Motor Trucks Loaded with Building Material down Cyrus Hill on the Way from Lily Bay to the Site of the New Dam at Ripogenus Gorge, near Millinocket, Maine

Thirty-One Miles of This Kind of Highway was Built through the Heart of the Maine Wilderness to Facilitate Transport of Material for the Dam

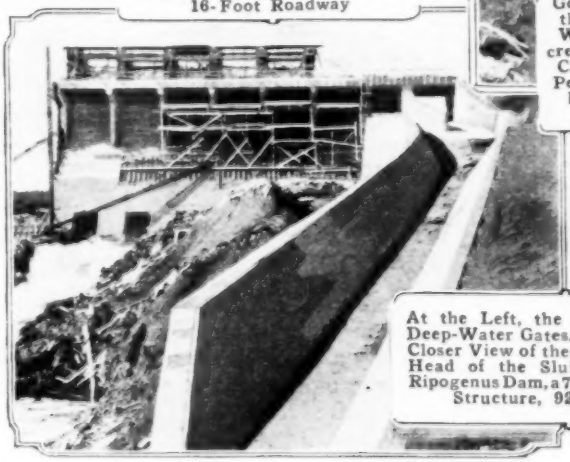
This Shows the Old Ripogenus Log Dam in the Foreground, and the New Cement Structure Rising in the Rear. The Old Dam will Be 60 Feet under Water When the New Lake or Reservoir Fills Up

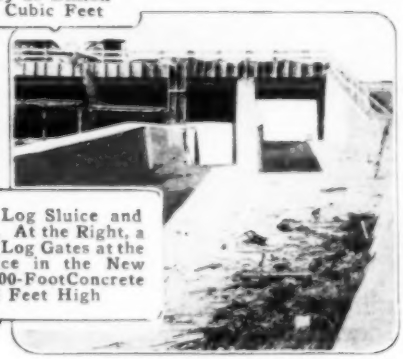


Section of Front of the New Ripogenus Dam: The Cement Walls Seen Rising from the Face of the Dam Support a 16-Foot Roadway



General View of the New Dam, Which will Increase the Storage Capacity of the Penobscot River by 25 Billion Cubic Feet





At the Left, the Log Sluice and Deep-Water Gates. At the Right, a Closer View of the Log Gates at the Head of the Sluice in the New Ripogenus Dam, a 700-Foot Concrete Structure, 92 Feet High

INSPECTORS FIND PRAIRIE HUT IN CHICAGO

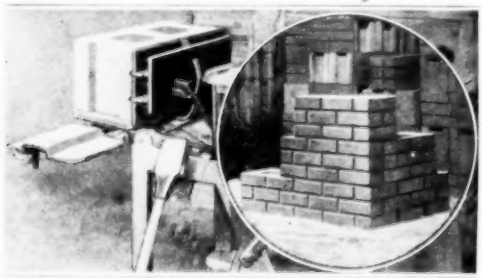
What could be more incongruous than the presence of a typical western-Kansas sod house within the corporate

Because of Its Insanitary Condition, This Sod House at Chicago has been Condemned by the City Health Department

limits of Chicago? Such a dwelling was discovered some weeks ago by inspectors from the department of health. The hut, a flat-roofed structure of aged appearance, was condemned because of its lack of sanitation facilities. It had been occupied by a family of six persons.

CONCRETE-BLOCK MACHINE HAS SPECIAL FACEPLATE

A faceplate for a concrete-block machine has been devised by a resident of Indianapolis which makes grooves on the front of the blocks so that each one appears to be made of several smaller blocks. This effect is produced by ribs that are inserted through slots



Concrete-Block Machine Having a Faceplate with Removable Ribs Which Make Each Block Appear to be Composed of Several Small Ones

in the faceplate. While the block is still in the machine the ribs are withdrawn from the plate, leaving smooth clean-cut grooves. These serve as air passages and prevent any suction that might cause the concrete to stick to the plate. This invention makes possible the use of larger blocks than would be appropriate for many building purposes, because the markings give the impression that much smaller units have been used.

TEACHING ARITHMETIC BY MECHANICAL DEVICE

Arithmetic is now being taught by means of a mechanical device which, it is claimed, enables pupils to read the sum of figures without adding them, just as they read words without spelling out the letters one at a time. Thus it is said to be just as easy to teach a child that in addition 9-8-3 spells 20 as that c-a-t spells cat. The apparatus has an inner and an outer cylinder, the former covered with combinations or groupings of figures for giving drills in addition, subtraction, multiplication, and division, while the outer cylinder has 20 sliding shutters, the openings of which expose problems. As the inner cylinder is revolved and the problems pass the openings, the pupils call out the answers. The construction is heavy sheet metal, with the exception of the chart of figures and the shutters, these being made of heavy cardboard and fiber material. Noiseless rollers enable the machine to be moved about easily.

WANT TOPOGRAPHIC ATLAS OF COUNTRY COMPLETED

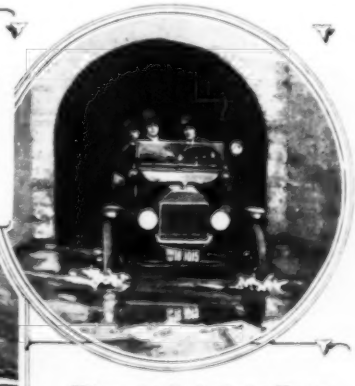
A committee, of which a Harvard professor is the head, has been formed to aid, by all practical means, in hurrying to completion the topographic atlas of the United States. The Geological Survey has devoted many years of ex-

cellent service to preparing these detailed maps, but the task is so great that only 40 per cent of the country has been covered and now some portions of the records are so old as to be of questionable value. From the point of view of national defense, and for many other reasons, a more speedy prosecution of the work is to be urged.

AUTO PROCESSION PASSES THROUGH OHIO SEWER

Seventeen motor cars recently carried a party of city officials and newspaper men through a long storm-water sewer at Columbus, Ohio. The occasion was the formal inspection of the underground passage, a mile and a half in length, which had just been completed to connect the south side of the municipality with the Scioto River for drainage purposes. Nearly two hours were consumed in making the excursion, which was not without incident. The machines were lowered down a steep incline, one by one, with block and tackle, into the mouth of the sewer. After the procession had got well under way one of the leading cars developed engine trouble. This caused a halt, and because the motors of the other cars were allowed to run idly for a while, the passage soon became filled with noxious fumes. Several members of the party escaped through a manhole, while the others coughed and stuck it out until the disabled machine was repaired and the trip resumed.

The Machines were Lowered, One at a Time, with Block and Tackle down a Steep Incline into the Sewer



When the End of the Underground Passage was Reached the Cars Forded the Scioto River

FOREST RANGER GIVES UP HORSE FOR MOTORCYCLE

A forest ranger, whose route lies over many miles of mountain trail not far from Los Angeles, now uses a motorcycle instead of a horse on the journeys which he must take to watch for forest fires and for violators of the fish and game laws. The change in mounts has enabled him to cover the distance in half the time which was required formerly. The machine used is light in weight but with a strong engine, which drives it easily up the steep rocky inclines. Before the motorcycle could be used to the best advantage it was necessary to blast away a few bowlders along the path and to grub out some shrubs and bushes.

Forest Ranger in Southern California Riding over a Rocky Trail on a Motorcycle, Which He Found More Serviceable Than a Horse, and Less Expensive

This Shows How an Airman Flying at the Speed Now Attained by Aeroplanes might Give Timely Warning The Flier is Seen Outstripping the Windstorm Whose Ominous Finger Points Downward in the

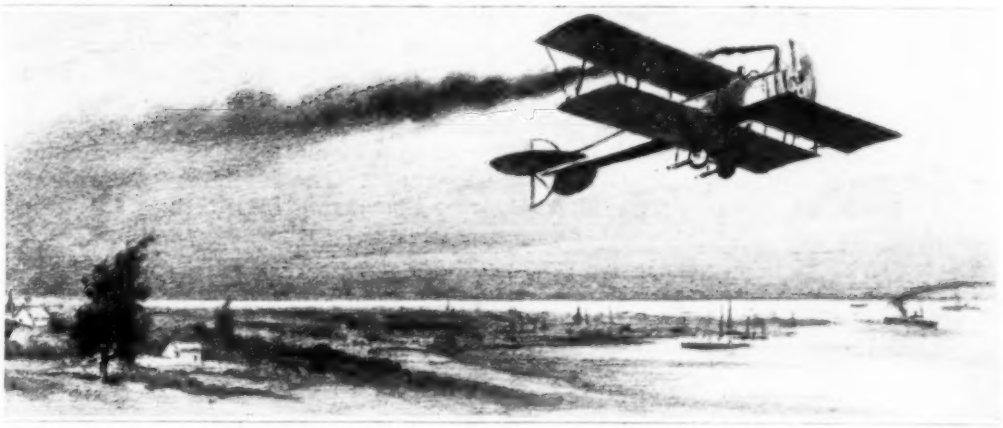
PREFER METAL AMERICAN FLAG TO CLOTH ONE

Because flags of silk or bunting, no matter how good the material, will eventually become faded and torn in spite of the best care, a resident of Boone, Ia., has designed a metal flag which has proven a very satisfactory substitute. It is not angular and inartistic as might be supposed, for the hollow tubing, special wire cloth, brass, tin, and copper of which it is made are combined so skillfully that at a little distance it looks exactly like a cloth flag unfurled by a moderate breeze. The wire cloth is used in such a way that it allows the wind to pass through it, thereby reducing the wind pressure. In spite of the materials used, it is comparatively light. An American flag of this sort flies from the top of a tall bank building in Boone, and it has been found to possess many advantages over a cloth emblem. It needs to be taken down but once in two or three years to receive a fresh coat of paint and remains gracefully unfurled even when there is no wind. It serves as a weather vane and never becomes ragged or twists about the staff.

Metal Flag Which Flies from the Top of a Bank Building in Boone, Iowa

HOW AEROPLANES MAY GIVE WARNING OF STORMS

It is now no uncommon thing for American airmen to outstrip an onrushing storm in the course of their long and speedy flights, and it is possible that the time is not far distant when due warning of the approach of cyclones and other dangerous storms may be regularly given by aeroplane in the manner pictured above by the imagination of the artist. The machine seen in the illustration, with its trailing smudge as a daylight storm signal and



of a Storm's Approach to the Inhabitants of a Countryside Threatened by Hurricane, Cyclone, or Tornado. Distance, While the People Warned by His Signal Seek Refuge in Cyclone Cellars and Basements

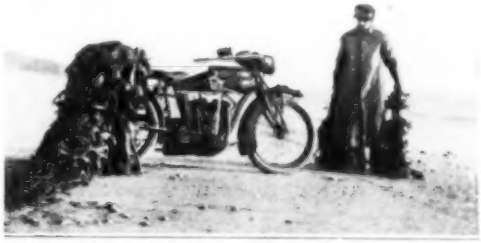
its speed of, say, 120 miles an hour, would be able to warn the inhabitants of a wide stretch of territory, in time for them to seek the shelter of basements and cellars, before the arrival of the storm spreading destruction in the distance. By night, the aeroplane, flying low so that the noise of its engine would be plainly heard and with a signal flare of light, might be equally effective as a life-saver in sections subject to cyclonic storms. At any rate the imaginary scene depicted by the artist is well within the bounds of possibility as an actual occurrence of the near future.

GREASE-SPREADING DEVICE FOR THE CHICKEN COOP

As young chickens peck at the grain in a new type of feeding tray lately devised, their heads come in contact with a wick and are daubed with grease. The preparation, consisting of lard and kerosene, is a specific for vermin and its application in this manner saves much time and labor. The wick is circular in shape, supported above the tray, and kept supplied with grease by a reservoir, which is of such capacity that it requires filling only occasionally.

HARVESTING KELP WITH A MOTORCYCLE

Kelp gleaning on the seashore with a motorcycle is the lucrative occupation of a man living in Redondo, Calif. Kelp, as is well known, is valuable because of the potash and other chemicals which it contains, and many machines

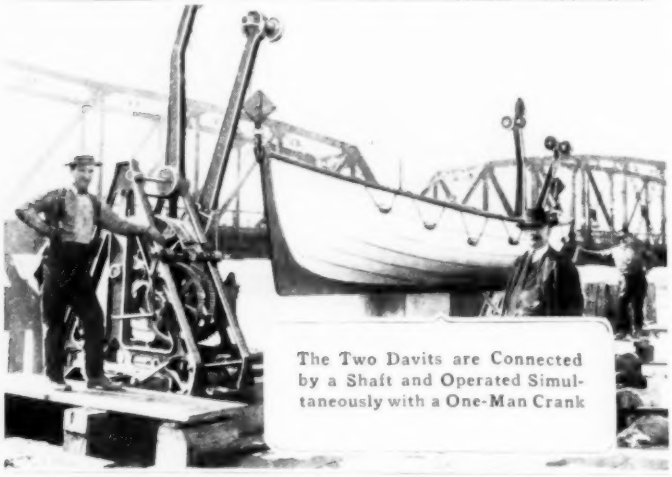


A Man Living in Redondo, California, Who Patrols the Beach on His Motorcycle and Gathers Loads of Kelp, Which He Sells to a Chemical Factory

have been invented for harvesting it. But this man uses none of these. Instead, he patrols the sandy beach on his motorcycle and when he finds a number of weeds thrown up by the waves he dismounts and ties them to the rear of his machine so that they trail along behind. When he has accumulated a load, which may weigh as much as several hundred pounds, he drives to a near-by chemical factory and sells it. Within a few hours the rollers toss up another harvest.

NEW TYPE OF DAVIT PASSES GOVERNMENT TESTS

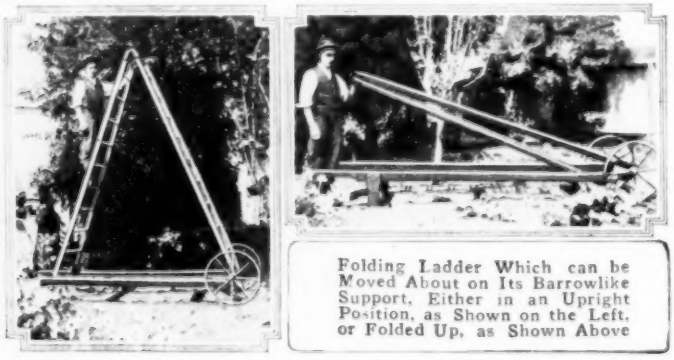
One seaman unaided is able to lower a loaded lifeboat quickly and, unless the sea is heavy, safely, with a new type of davit that has lately passed Federal tests at Portland, Ore. Although it is more complicated mechanically, and doubtless more expensive to install, than the kind in general use, many of those who have seen the apparatus demonstrated have been impressed with its practicability. This does not seem strange when it is known that in actual tests one man has lowered a loaded boat to the water in 48 seconds. The davit has two straight arms that swing in an arc of 90°. At the upper extremity of each there is a sheave over which the rope passes to a drum. Obviously it is used in pairs, but each set is connected by a shaft so that a crank on either davit operates the separate mechanisms in unison. In normal position the arms are upright. After a boat has been loaded, one of the operating cranks is turned until the craft is raised several inches. The gears are then shifted so that the arms are lowered and the boat swung free from the ship. The two drums are unreeled simultaneously until the lifeboat touches the water.



The Two Davits are Connected by a Shaft and Operated Simultaneously with a One-Man Crank

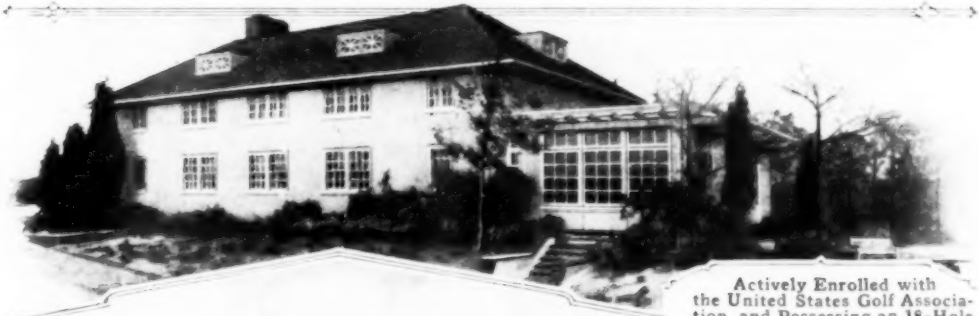
PORTABLE FOLDING LADDER FOR ORCHARDS

A portable folding ladder, especially convenient for use in orchards, has been devised by a California fruit grower. The ladder itself consists of two members each having rungs, which are fastened together like a stepladder. This portion of the device is mounted on a framework which resembles an elongated wheelbarrow except that it has two wheels at the front end instead of one. One of the legs of the ladder is pivotally fastened to the front end of the support. If desired the ladder can be folded up and laid full length in the barrow or it can be wheeled about in an upright position from tree to tree.



Folding Ladder Which can be Moved About on Its Barrowlike Support, Either in an Upright Position, as Shown on the Left, or Folded Up, as Shown Above

PHILADELPHIA GOLF COURSES AND CLUBHOUSES



Actively Enrolled with the United States Golf Association, and Possessing an 18-Hole Course That Puts Interest into Every Stroke, the Pine Valley Golf Club, Sumner, New Jersey, Has No Closed Season. The Links Roll and Slope, Rise and Drop, and Include Hills and Knolls of Every Variety. The Clubhouse, as may be Seen from the Picture Above, Is a Comfortable, Roomy Residence That is Artistically Designed and Beautifully Situated. The Course Has No Hole That Is Dull, for Each Has a Different Kind of Approach. Incidentally the Fairway before the Seventh Green, Pictured at the Left, Is the Only Stretch of Really Flat Ground to be Found on the Links

Philadelphia has Responded to the Popular Clamor for Public Golf Courses by Establishing a Very Good One in a New Park That has been Opened at the Western Extremity of the City. Two Unpretentious, but Convenient and Well-Arranged Clubhouses, One Intended Solely for Men and the Other for Women, have been Erected. The Links Extend over a 100-Acre Tract of Land That is Broken with Hills, Valleys, and Small Streams. Cobb's Creek, After Which the Park and Course have been Named, has to be Cleared on Five Different Drives. One of the Holes Guarded by the Water, the Third, is Pictured Below at the Right. The Result of a Poor Approach Shot Here can be Clearly Understood

LAWN-TRIMMING TOOL MADE WITH ADJUSTABLE BLADE

For trimming grass along the edges of a sidewalk and around shrubbery

The Wheel Follows the Outer Edges of a Sidewalk so That the Knife Cuts a Straight Groove

and flower beds, an implement has been introduced which materially lessens the work that is usually connected with such operations. It consists of a curved knife, held in an adjustable mounting at one side of a flanged wheel, attached at the end of a long handle. The margin of a sidewalk serves as a track for the wheel and as the tool is pulled the knife makes a straight, clean cut about an inch and a quarter wide and of the same depth.

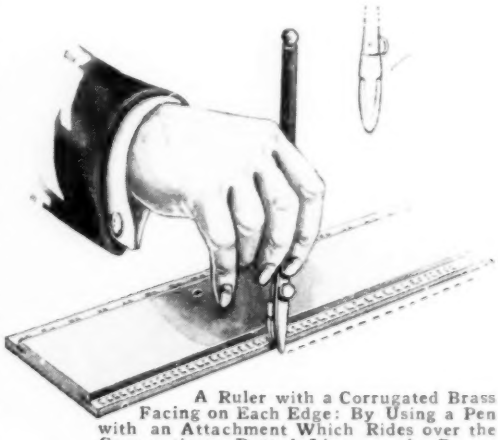
Arkansas stockmen, during recent cold weather, used electricity to warm the molasses which they mixed with the stock food. The sirup was placed in a vat, which in turn was set in a larger receptacle containing water. Three electric heaters immersed in the water were used to thaw out the molasses, after which one kept it at the right temperature.

SOLDER WORKMEN'S TIME CHECKS TO LUNCH PAILS

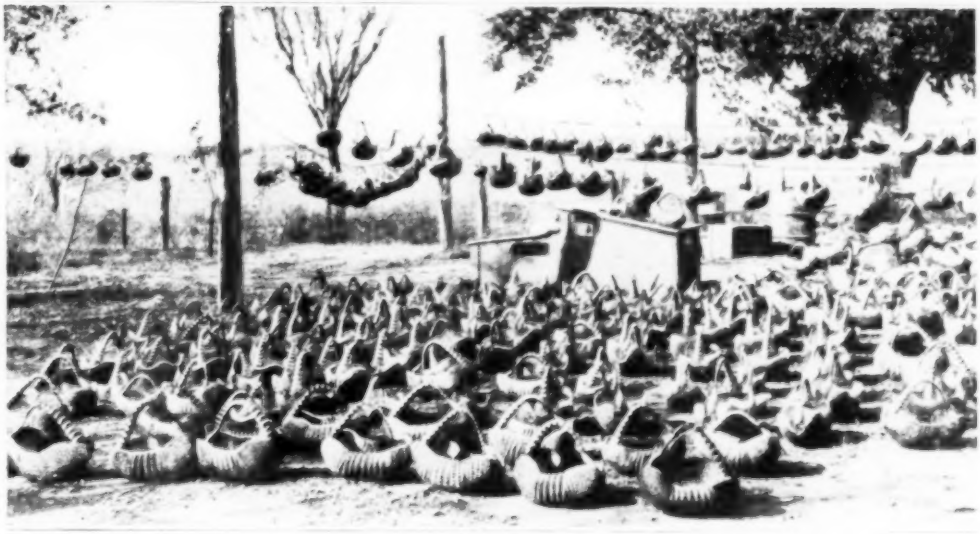
Brass time checks have been the means by which the timekeeper for an eastern contracting firm identified a large number of laborers in the concern's employ who could speak scarcely a word of English. However, much confusion was created by the fact that the men frequently lost or misplaced these important bits of metal, so the company hit upon the plan of soldering the checks to the workmen's dinner pails. From that time on no checks were lost or forgotten.

DRAFTSMAN'S RULER FOR MAKING DOTTED LINES

Neat dotted lines can be made as rapidly and accurately as plain ruled lines by using a special draftsman's ruler which has its two edges faced on one side with a corrugated strip of brass. The ruler is used in connection with a ruling pen to which a little device called a leg is fastened. This leg extends downward to within a short distance of the pen point, and when the pen is drawn along the edge of the ruler, the leg rides over the corrugations, causing spaced gaps in the line. One set of corrugations is spaced uniformly throughout, while with the other, the ridges are separated by alternately wide and narrow gaps.



A Ruler with a Corrugated Brass Facing on Each Edge: By Using a Pen with an Attachment Which Rides over the Corrugations, Dotted Lines can be Drawn



COPYRIGHT, UNDERWOOD & UNDERWOOD

At Times Several Hundred Armadillo Shells are Strung on Wires or Laid on the Ground to be Dried by the Hot Rays of the Sun

ARMADILLO FARM IN TEXAS SOURCE OF SHELL BASKETS

Many of the armadillo baskets shown in the display windows of city shops come from a farm on the Texas frontier, instead of the jungles and plains of South America, as is probably the popular impression. Although these queer mail-clad animals occur chiefly in the forests of Surinam and Brazil, a few species are found as far north as Texas, and these are the ones whose buckled-plate shells are dried, varnished, polished, and shipped as novelties to the northern cities. The armadillo is usually nocturnal, and therefore is most often hunted at night with lanterns much as the negroes of the South search for opossums. They are harmless and offer no fight when captured. The body of the giant armadillo, a species known in the tropics, is about a yard long.

POWDER PLANT HAS CHUTES FOR FIRE ESCAPES

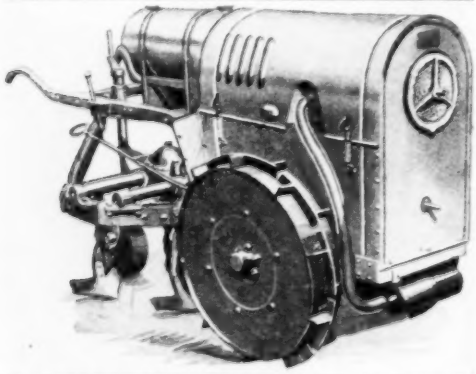
Fire escapes in the form of large metal chutes have been provided by a powder company at Carney's Point, N. J., for the safety of the men working in its smokeless-powder plant. Just under the second-story windows of the numerous small structures in which the men work, are fire-escape platforms from which lead several of the metal chutes, placed at a sharp angle.

View of Smokeless-Powder Plant at Carney's Point, New Jersey, Showing the Large Metal Chutes Which Serve as Fire Escapes for the Workmen

In an emergency the men can run through the windows and slide safely to the ground in an instant. The dangers of handling smokeless powder are not as great as popularly supposed, for it does not explode like black powder but instead burns rapidly. Consequently the company has taken every precaution against fire. So convenient are the chutes that many men use them daily when leaving the plant.

FRENCH MOTOR HOE RUN BY OIL ENGINE

Among recent improvements in agricultural implements is a motor hoe of French invention, designed for use in fields, orchards, vineyards, and gardens, or on cotton and rubber plantations. The machine is run by an oil engine, is easily controlled by a man walking behind it, and is said to do considerably more work than is possible with either hand or horse hoes. Its size allows it to pass through crops without damaging them, and it can be turned in its own length. Knives on the hoe are moved backward and forward by the action of the motor and are also worked by the motion of the machine when traveling. It is made in two sizes, with 2¾ or 4-hp. engine, and the depth of the hoe is adjustable. The machine has received various awards in France and Great Britain, among them a diploma from the Royal Horticultural Society.



This New Motor Hoe Is a French Invention Which Works Rapidly without Damage to Growing Crops and Is Easy to Handle

UNIQUE SOUTHERN SCHOOL FOR SUGAR EXPERTS

The sugar-cane growers of Louisiana and likewise the educational interests of that state several years ago recognized that the proper development of the sugar-cane industry called for special technical training which no institution in the country was adequately equipped to give. This led to the founding of what is known today as the Audubon Sugar School, which is a part of the Louisiana State University at Baton Rouge. To this splendidly equipped institution have been brought leading sugar experts of the country and its enrollment includes students from sugar-producing lands in distant parts of the globe. While the most of the students' work is done in Baton Rouge, nevertheless the school's experiment station at Audubon Park, New Orleans, plays a very important part in the course and offers items of keen interest to visitors. The sugar school is unique in this country in respect to the completeness of its course in sugar engineering, which stresses equally the engineering and chemical sides of the manufacture of sugar and lays particular emphasis on the engineering methods by which chemical processes can be carried out.

To properly prepare young men to be sugar experts, five years of study is required. Speaking generally, the technical work is divided into three groups, chemistry, mechanical engineering, and agriculture, with about 90 per cent of the work being confined to the first two groups. The work in chemistry teaches the student the scientific processes in manufacturing sugar. The mechanical engineering prepares him to handle with skill the expensive and complicated machinery used in sugar factories. The agricultural work trains him so that he can manage a sugar estate on which there is a variety of crops in addition to cane, and where live stock must be looked after.

Each student must spend 10 weeks of both his fourth and fifth year either at the experiment station at New Or-

Engineering Laboratory of the Audubon Sugar School: This Center for the Training of Sugar Specialists has Won Distinction Because It Stresses Equally the Engineering and Chemical Sides of the Manufacture of Sugar. The Course for a Sugar Engineer Is of Such a Special Character That Five Years is Required to Complete It

Entrance to the Grounds of the Audubon Sugar School, Louisiana State University: This School Is Unique in America in Respect to the Completeness of Its Course in Sugar Engineering. Its Enrollment Includes Students from Sugar-Producing Lands in Many Parts of the Globe

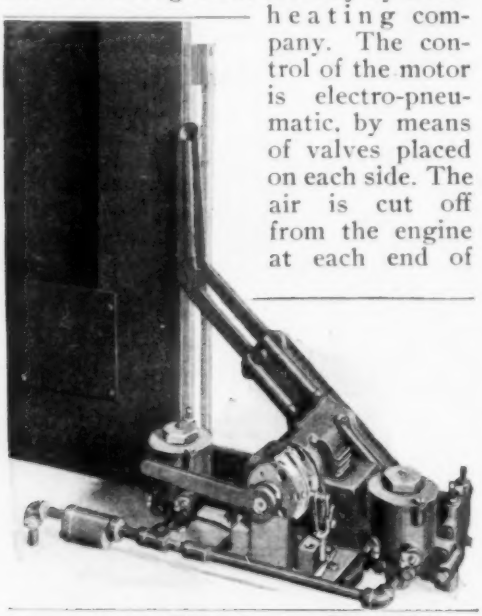
Students Cutting Sugar Cane in a Field Connected with the School's Experiment Station at Audubon Park, New Orleans. One Distinguishing Feature of the Institution Is the Practical Work in the Field and the Sugar House Required during Two Full Seasons

Forge Shop: The Students are Required to Study All the Machinery Used so as to Be Able to Manage a Plantation Which Not Only Grows Cane but is Also Fully Equipped to Make Sugar. In Preparing for Such an Undertaking the Work in This Shop Plays an Important Part

leans, already referred to, or with some large sugar company. The fields of the experiment station are planted with many varieties of cane, much of the work being done by the men themselves. These fields are so laid out that they present various problems in drainage that require special study. The sugar house contains a nine-roller mill, a complete diffusion plant, juice weighers, clarifiers, filter presses, double-effect evaporators, and much other equipment, the cost of all machinery and apparatus at the station being approximately $100,000. Before the grinding season starts the students are required to overhaul the entire sugar house, cleaning and repairing all the machinery. After the grinding season has begun each man is assigned in turn to take charge of different parts of the house.

NEW PNEUMATIC ENGINE TO OPERATE CAR DOORS

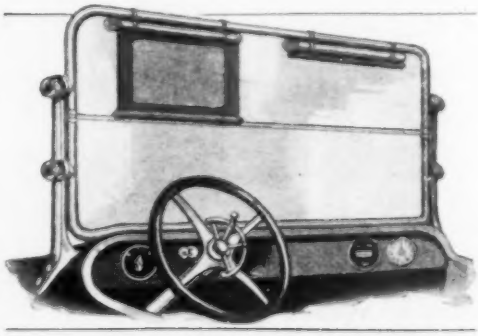
For opening and closing heavy car doors a pneumatic motor of a new type has been brought out recently by a car-heating company. The control of the motor is electro-pneumatic, by means of valves placed on each side. The air is cut off from the engine at each end of the stroke, which economizes the air used and also permits atmospheric check, or cushioning, so that the door does not slam. There is a safety feature which permits a passenger to hold up the door in case of premature closing; and if clothing is caught in it, the door may be pushed open 5 in., but this is the limit of emergency opening, as there is a positive stop to prevent a false opening. The engine is extremely light, the cylinders being of brass tubing. The arm, rack, and pinion are of cast steel. Opening and closing of the door are controlled by a standard push button. A number of the motors are in use on the New York Municipal Railway.



Pneumatic Motor Which Opens or Closes a Railway-Car Door and is Controlled by a Push Button

SPRING SHADE FOR AUTOS PROTECTS THE EYES

Goggles are rendered unnecessary for motorists by a novel auto shade or curtain, which hooks over the top of the windshield and can be rolled up or down as needed. It is essentially a blind with an isinglass window, or "vision shield," fastened to a spring roller and operating just like an ordinary spring blind. A heavy rod along the bottom keeps the curtain from blowing about in a wind, and rubber washers at the ends of the spring roller and of the bottom rod keep them from damaging the glass in the windshield.



This Shows the New Auto Shade as It Appears When in Use, in Front of the Driver, and Also When Rolled Up Out of the Way

The "Devil's Dance Floor," a Beautiful but Very Dangerous Stretch of Motor Road in San Bernardino County, near Ontario, California

NEW MOTOR HIGHWAY SCENE OF MANY ACCIDENTS

One of southern California's motor roads has proved so treacherous that it is known as the "Devil's Dance Floor," and is to be reconstructed. It consists of a two-mile stretch of asphalt pavement near Ontario, in San Bernardino County. During the first six months it was open to traffic it was the scene of about 80 accidents. These smash-ups resulted in the death of five, and the serious injury of 32, persons. The highway extends across a low sweep of foggy land between two ranges of hills, and at night invariably becomes damp and slippery, while the roads connecting it at either end are dry because they are surfaced with a different material. As cars glide off the latter pavements onto the wet asphalt, especially when traveling rapidly, they are prone to skid, strike the ground bordering the road, and often turn turtle. One unusual accident occurred when a physician's car crashed against a telephone pole, snapping it off and hurling a lineman, at work at the top, into the tonneau of the machine. The driver was badly hurt and the other man's skull fractured. The highway commission has decided to overcome the difficulty by giving the stretch a corrugated-concrete surface.

APPARATUS FOR TESTING AEROPLANE PROPELLERS

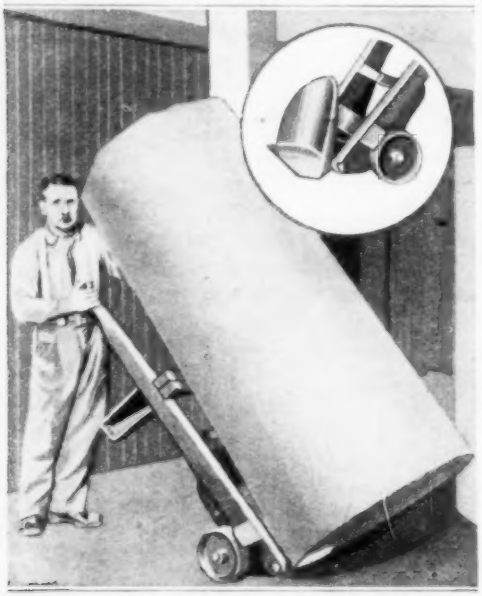
An apparatus, used to ascertain whether or not aeroplane propellers have the proper balance, has been brought out by a well-known English firm. The device fastens to the wall by means of a bracket and embodies a rocking arm that swings on knife-edges. Projecting from the arm is a mandrel on which the propeller to be

Device Which Shows Whether or Not the Blades of an Aeroplane Propeller Balance Properly

tested is placed. The balance or lack of balance in the air screw is shown by a pointer and quadrant. When the balance is perfect the indicator remains perpendicular and points to zero. A means of control is provided which prevents undue swing of the apparatus, caused by the inertia of the propeller. The screw can be turned around to test the balance in any position, without removing it from the mandrel. The apparatus may also be employed in testing individual layers that go to make up a propeller.

HANDY SCOOP TRUCK FOR ROLLS OF PAPER

Rolls of printing paper are frequently damaged by improper methods



Heavy Rolls of Print Paper, Six Feet High and Weighing Almost a Ton, are Easily Handled with This New Truck and Its Swivel Scoop

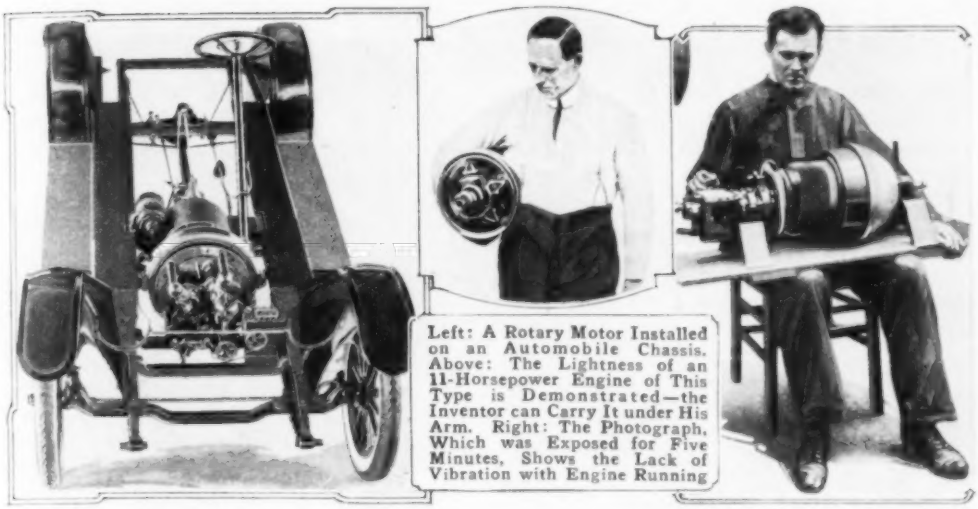
of handling from railroad cars to the pressroom, and in the pressroom itself while being shifted about. To eliminate this damage, which is expensive, a new truck has been designed and patented by a paper-mill superintendent, and has already proved its value. Its general form is that of the familiar hand truck, but it is furnished with a tilting, scoop-shaped steel shoe, which receives the lower end of an upright roll of paper and enables it to be laid upon the truck quickly, easily, and safely. The upper end of the roll rests on a shaped cradle which forms part of the truck.

X-RAY USED TO PROVE AGE OF BOY IN COURT

To physicians connected with the juvenile court of Cincinnati was recently assigned the unusual task of determining the age of a lad by the use of the X-ray. According to the laws of Ohio a boy, 17 or younger, comes under the jurisdiction of the juvenile court, whereas one 18 or over would be tried, on a criminal charge, in the criminal court. The parent of the boy claimed that he was 17, while the physicians were strongly of the opinion that he was 18 or older. To settle the question X-ray photographs were taken of the bones of his arms and lower limbs. It is a fact, well recognized by the medical profession, that in the transition from childhood to maturity these bones undergo a change that is quite distinct. The photographs in this case showed such a development of bony tissue as to prove conclusively that the boy was 18 years old or over, and consequently his case was turned over to the criminal court.

IMPROVED ROTARY MOTOR FOR AUTOMOBILES

A rotary motor for automobiles, which received mention in this magazine some time ago, has been since developed by its inventor, a resident of Sandusky, Ohio, and was recently given a hard road test from which it is said to have emerged successfully. A car equipped with an 18-hp. engine of this type was driven from Los Angeles, Calif., to Chicago, and completed the trip, it is claimed, with a record of 22½ miles of travel per gallon of gasoline. The car complete weighed 3,000 lb. Advantages claimed for this motor include lightness, freedom from vibra-



Left: A Rotary Motor Installed on an Automobile Chassis. Above: The Lightness of an 11-Horsepower Engine of This Type is Demonstrated—the Inventor can Carry It under His Arm. Right: The Photograph, Which was Exposed for Five Minutes, Shows the Lack of Vibration with Engine Running

tion, and the elimination of the water-cooling system. Its design is a departure from the usual wheel plan of rotary motors. It is built with either five or any odd number of cylinders, arranged like the barrels of a revolver, each parallel with and clustering around the main shaft. The parts of the cylinders being identical, one cam actuates all valves in succession and one ignition ring serves for firing all the cylinders. By this arrangement, a flywheel effect is obtained without straining the mechanism or interfering with lubrication.

PORTABLE GAS PLANT FOR COOK STOVES

Any cook stove or range can be converted into a gas stove in a few minutes' time by means of a portable gas burner recently placed on the market, which generates gas from coal oil or kerosene and can be installed without the aid of a mechanic. It consists of a simple set of two combined gas generators and burners with valve connections, as shown in the illustration. These burners are placed in the fire box of the stove, connection with the regulating valves being easily made through the stove doors or draft holes by two small, flexible metal pipes. Steel brackets on each end of the burner base hold the burners rigid in the stove and can be adjusted to any depth or width of fire box. The coal-oil supply tank, of any size from one gallon up, is hung by a hook or nail to the wall near by and connected by a flexible metal feed pipe to the regulating valves. Gas is generated from the oil by the heat within a few seconds after opening the valves and lighting one or both of the burners. The appliance can also be used in heating stoves of the base-burner type.

Cooking with Gas Made in a Coal Stove. The Kerosene Supply Tank is Seen on the Wall and Regulating Valves on the Ledge of the Stove. The Insert Shows Details of the Burner Set in the Fire Box

CURIOUS BRIDGE ON THE MEXICAN BORDER

Crossing the boundary line between the United States and Mexico, at Tia Juana, there is a queer ramshackle

This Temporary Double Trestle Serves as a Railway Bridge across the Mexican Border. Note the Rails on Either Side of the Open Center

bridge, built as a temporary substitute for a structure that was washed away by the floods a year ago. It bridges an arroyo and is simply a double trestle, with open space in the center, but serves all kinds of traffic, including the trains of the Mexican Central Railway, automobiles, pedestrians, horsemen, and even herds of cattle and flocks of sheep. Each trestle carries one of the rails of the railway track, the construction being such that trains and automobiles straddle the open space when crossing, and all other traffic must get off the bridge. The structure is 400 ft. long and has a safety platform for pedestrians built out on each side near the center.

¶An observation station in Venice is said to be equipped with electrical microphones with which watchers can detect the approach of Austrian airmen as soon as they leave Trieste, some 60 miles away, and so give the city ample warning.

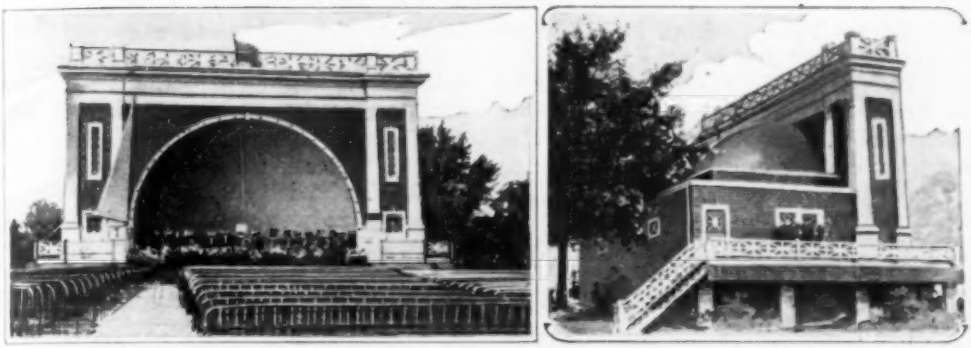
SPARK FROM MAN'S BODY CAUSES GARAGE FIRE

When a resident of Dubuque, Iowa, wearing a fur coat and rubber boots, walked hurriedly to his garage on a cold morning recently, he did not realize that his movements were storing up a dangerous amount of electricity in his body. But the fact was that the friction of his arms against the coat caused a certain amount of static electricity to be generated, and this was stored in the man's body because it was insulated from the ground by his rubber boots. When he sought to prime the motor of his car with a mixture of gasoline and ether, using a metal squirt can—probably of copper, which is a good conductor of electric current—the can was brought so close to the motor that a spark was produced between it and the priming cup, igniting the gasoline. The can exploded, throwing the flaming liquid over both man and car. The man escaped with severe burns, but the car and garage were completely destroyed.

EAR PHONE ELIMINATES FOREIGN NOISES

An ear phone for the deaf has been designed with a view to eliminating the rumbling and grating noises which are so annoying to many deaf persons using sound-magnifying instruments. The transmitter is worn in an exposed

The Transmitter and Battery are Here Shown Worn under a Bolero. Right: Cross Section of Transmitter Showing Roundabout Path Which Sound Waves Travel. The Black Portion Is the Drumhead



Front and Side Views of Shingled Band Stand Erected in One of Denver's Large Parks. The Iron Benches Arranged before the Structure Furnish Seating Accommodations for 2,000 Persons

position in the usual manner. The sound waves enter through small holes in its face but do not strike the diaphragm directly on account of a protecting wall of steel, which diverts the waves out toward the circumference and thence around to the opposite side of the hollow instrument. Here the waves strike what is called the drumhead, which throws them against the diaphragm. Heretofore, in attempting to eliminate foreign noises, attention has been centered on the microphone, but in this transmitter the sound is altered before it strikes that sensitive member. The drumhead also helps to modify the sound. It is made of brass, rubber, ivory, glass, lead, or other material, according to the sharpness of tone desired. The character of its curve and its thickness are varied according to the needs of the wearer.

GREEN-SHINGLE BAND STAND IN CITY PARK AT DENVER

Iron benches with seating capacity for about 2,000 persons are arranged before a rather attractive band stand erected in the City Park at Denver, where, during the warm months, public concerts are held frequently. The structure is about 65 feet in width and 35 feet high, its exterior finished with green shingles and trimmed in white. The foundation is built of green-glazed brick, and the piers at the sides of tapestry brick. Boxes of blooming flowers extend across the front margin of the platform, forming a beautiful screen, while others, placed in the windows at the sides of the building, contribute refreshing touches of color. Beneath the arched dome, the platform furnishes sufficient space for about 50 musicians, and at the rear ample dressing-room accommodations are provided.

NEW CONCRETE MIXER RUN BY FOOT POWER

Foot power is employed to run a new small-sized mixer for use in preparing concrete, mortar, and the like. A seat is provided for the operator who revolves the mixing cylinder by means of pedals, while the dumping of the contents through an end spout is controlled by levers. If preferred, two men instead of one can be employed as

A Concrete Mixer, Having a Capacity of from Three to Five Yards of Mortar, Which is Operated by Foot Power

operators. The machine is ball-bearing throughout and is equipped with a heavy flywheel, so that mixing can be accomplished with much less effort than with a hand-power machine. The capacity of this outfit is from three to five cubic yards.

FIREMEN'S CATS TRAINED TO DESCEND BRASS POLE

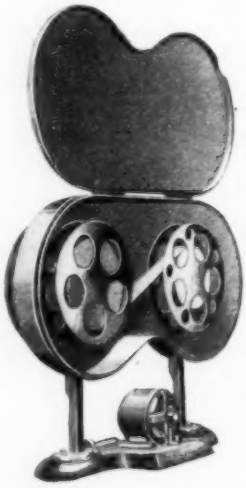
A fire company in Boston possesses two pet cats which are especially popular with all the men because they have learned to respond to a fire alarm by sliding down the brass pole in the station just as the firemen do when descending from their sleeping quarters on the second floor to the trucks below. On hearing the gong the agile creatures will jump to the polished metal rod and throw their legs about it, much as they do when descending a small tree, and then slide to the floor below like a flash. The pets seem to quite enjoy the trick, as the accompanying photograph shows.

NEW X-RAY APPARATUS AIDS SURGERY

A new X-ray apparatus has been developed in one of the casualty-clearing stations in France, which according to reports appears to supplement present-day X-ray photography at the point where the latter ceases to perform effectively. In other words, in photographing certain hidden parts of the body a type of picture is obtained which has not been procured heretofore. It is said that in this new work an attempt is not made to delineate such dense tissues as bone, but living organs instead, pictures of which can be obtained with remarkable clearness, showing at a glance by what gross lesions the organs are affected. For example, the wounds in any organ can be pictured. The blood vessels of the brain can be shown, together with a blood clot, if one exists, while the actual substance of the brain is not shown. The apparatus is described as working as long as the body is alive, and even until molecular death has occurred, but after that it does not work.

FILM REWINDER WITH NEW SAFETY FEATURES

An automatic film rewinder has been devised to lessen the dangers of the necessary process of rewinding moving-picture films after every exhibition. It will take films of any make, and was recently approved by the National Board of Underwriters. The machine entirely incloses the film when rewinding, and is driven by an electric motor, also fully inclosed. The construction is simple, there being two cast-aluminum magazines supported on uprights with a heavy iron base. The larger magazine contains the reels, and conforms to their shape; the smaller contains the motor. Reels of any size, up to 2,500 ft. of film, can be rewound. The machine stops automatically when the rewinding of any reel is complete, or if the film should break during the process.



PHONOGRAPH MUSIC SPEEDS UP TYPEWRITING PUPILS

The theory has been advanced that just as music helps a soldier to march with more vigor so also it should speed up a person's typewriting, and in conformity with this idea a phonograph has been installed in the typewriting room of the high school of commerce in Omaha. The instrument stands in the corner of the room and while the pupils practice on their machines a variety of selections is played on it. The aim is to relieve the monotony of the drill and so prevent the young people from becoming fatigued too quickly. The music is for practice only and is not intended as a permanent feature in connection with practical typewriting.

Pupils in Typewriting Class in Omaha High School of Commerce Practicing on Their Machines While a Phonograph Plays Various Selections

MOTOR LIFEBOAT IS BUILT FOR OCEAN LINER

Some little attention has been drawn to a motor lifeboat lately constructed in England for one of the Canadian Pacific steamships. The craft, which is 30 ft. in length and 9 ft. 4 in. of beam, is equipped with a three-cylinder, 25-hp. motor that gives it a speed of about 10 miles an hour and sufficient reserve power to tow several lifeboats of the usual type. Buoyancy chambers are installed fore and aft beneath the water-tight decking as well as under the side seats. A cushion of canvas-covered cork also extends around the hull flush with the gunwales. While the boat is not intended to be of the self-righting type, it is provided with a 500-lb. iron keel which gives it unusual stability. Provision has been made for the installation of a wireless set, which will be housed in a small cabin to be erected forward. The motor is completely covered. Amidships, on either board, relieving trunks with suitable valves are placed, to facilitate the prompt discharge of shipped water. When fully loaded the boat shows good freeboard. It has successfully passed the rigid tests of the board of trade.

Seaworthy Motor Lifeboat Built in England and Designed More Especially for Towing than Carrying Purposes. It will be Used by an Ocean-Going Passenger Vessel

FURNITURE WHICH MEETS SPECIAL HOME NEEDS

Card Table with Score Cards Always Visible, but Out of the Way, in Drawers under Glass Tops, as Shown in Detail

Library and Dining Table Combined, with Top That can be Extended to Five Feet

An Odd-Shaped Sewing Stand with Drawers, Side Compartments, and Handles

Light Iron Bed That can be Easily Swung Up into a Vertical Position and Rolled on Its Four Casters into a Closet. It will Pass through a Small Doorway

Handsome Folding Screen, the Center Section of Which is Built a Few Inches Deep to Serve as a Small Wardrobe, as Shown at Right, or as a Book and Magazine Rack, as Shown at Left. The Former is Provided with Convenient Drawers for Rubbers or Other Articles. Floral Decorations Make the Front Attractive

BY ECONOMY OF SPACE OR CONVENIENT DESIGN

Mission Chair, Convertible into Library or Dining Table by Swinging the Hinged Back into Horizontal Position

Folding Portable Writing Desk with Gusseted Leather Pockets and Full Set of Writing Accessories

A Disappearing Ironing Board and a Roll-Top Front Are Special Features of This Kitchen Cabinet

Cabinet, Resembling Large Phonograph Case, in Which Small Phonograph can be Kept, also Books or Records

Octagonal Sewing Stand Having Pockets and Holders on Under Side of Hinged Top

Sanitary Kitchen Table with Covered Bread and Flour Bins That Slide Easily, and Bracketed Revolving Seat

TRAFFIC SIGNS ADORNED WITH FLOWER BOXES

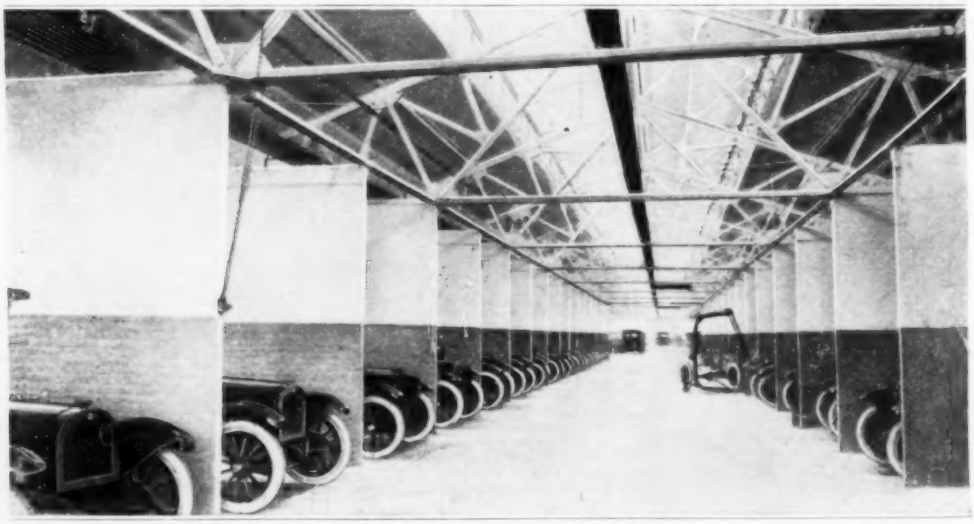
Many towns and cities have signposts at the intersection of important

Flower Boxes at the Base of Traffic Signposts Which Give an Artistic Touch to the Street Intersections

streets, for the purpose of keeping the traffic moving in the right way. Few communities, however, have realized that these posts can be utilized to beautify the streets, but in Valparaiso, Ind., flower boxes have been built about the bases of the posts. In them hardy flowers have been set out which seem to have thrived. The bit of color in the midst of the glare of the broad, hard pavement is very pleasing.

BRICK-WALLED STALLS IN AUTO-TESTING SHED

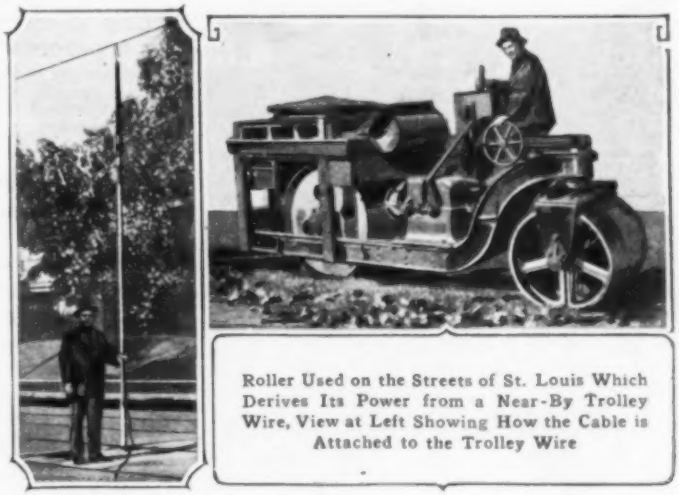
Connected with an automobile factory in Detroit is a large building so constructed that the engines of 30 or more cars can be tested in it at one time. The structure resembles a public garage with a broad passageway leading down the center, while on either side are numerous stalls. These are separated one from the other by solid brick walls so that a running engine in one compartment can be heard only faintly in the adjoining compartments. This arrangement makes it possible for a large force of experts to examine engines at one time, each being so shut off from the rest that he can readily detect a foreign sound in the car he is testing. The walls also serve to greatly diminish the fire risk.



Engine-Testing Building Connected with a Detroit Automobile Factory in Which the Fire Risk is Minimized by the Brick Walls Separating the Compartments. Here, at One Time, Several Experts can Test an Engine without being Disturbed by the Noise from Other Engines

STREET ROLLER OPERATED BY ELECTRICITY

A heavy roller which is operated by electricity is employed by the street-railway managers of St. Louis in the construction of pavement adjacent to their car tracks. Electricity is used because it is both convenient and economical for this particular work. The machine has two heavy rollers, to one of which is geared a regular street-car motor. Suitable provision is made for speed variation. Power is obtained for the motor through a cable which is hooked over the trolley by means of a long pole. The circuit is completed by a second cable connecting the motor with one of the rails. These two leads are each nearly 100 ft. long and so allow the machine ample range of movement without shifting the connections. When not in use they are wound on a reel mounted on the framework of the machine. The roller is carried to the scene of operation on a flat car and then, under its own power, descends on an incline platform to the street. It is likewise loaded by its own power.



Roller Used on the Streets of St. Louis Which Derives Its Power from a Near-By Trolley Wire, View at Left Showing How the Cable is Attached to the Trolley Wire

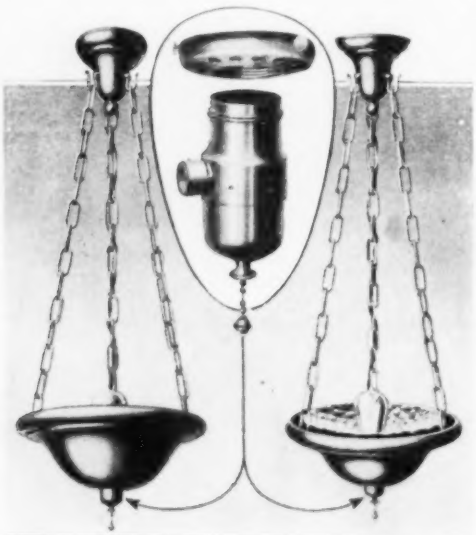
CLASSIC TEMPLE AND HUGE RELIEF MAP IN GUATEMALA

In the city of Guatemala, in Central America, a beautiful classic edifice has been erected, called the Temple of Minerva. It was built in commemoration of the educational progress which has been made in that country, due in part to the recent expenditure of several millions for public instruction. The structure, like the Greek temples after which it is patterned, is without walls, the massive roof being supported by Ionic columns. It stands in a large open area not far from a most unusual relief map, which covers a quarter of an acre of ground and reproduces in remarkable detail the physical features of the Republic of Guatemala. A special observation platform has been erected near by.

View Showing the Ionic Temple in the City of Guatemala, Central America, and, in the Foreground, a Portion of a Relief Map Which Covers a Quarter of an Acre

PULL-SOCKET OUTFIT FOR INDIRECT LIGHTS

Most of the indirect-lighting fixtures in the market do not permit of the use of the convenient pull-socket, or button, switches which have become so popular. But a new arrangement for this purpose has appeared in which a pull socket with its chain guide fits snugly into the bottom of the bowl of an indirect fixture, and protrudes through it just enough to enhance the artistic effect. The socket has a threaded bead on which a shade holder can be readily mounted. The bottom chain guide, with a pull chain hanging only the necessary length below the bowl, provides a most convenient form of local control. This style of socket can also be used on a side-wall fixture by attaching it directly to a nipple extending from the outlet.



New Socket for Use with Pull Chain. The Lower Pictures Show How It is Applied to Indirect-Lighting Fixtures

---

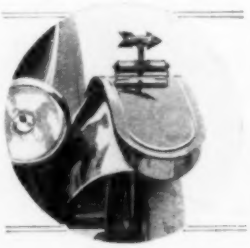
¶An English investigator is reported to have found that the electrification to which wool is subjected is not, as was supposed, due solely to friction among the fibers, but is also caused by drying, followed by the lowering of the temperature.

CITY PLANNING AIDED BY HYDROPLANES

Photographs of Santa Barbara, Calif., were recently taken from a hydroplane to be used in working out an elaborate plan for beautifying that city and as a help in examining possible locations for a proposed sewer outfall. The irregular topography of the region was well depicted in these pictures, and they show at a glance the city's position with relation to the sea and the mountains. The success of the effort has suggested to engineers that the same method might be employed on an even larger scale, as for example, in the region of the Colorado River, which changes its channel at many points after each flood and leaves bottomless lakes of mud, that can be traversed neither on foot nor by boat. To obtain by surveying the information that pictures taken from a hydroplane would supply, would often require weeks of work.

ELECTRIC DIRECTION ARROW FOR AUTOS

An automobile direction indicator has been devised consisting of a movable arrow, enameled red, which attaches to the front fender. It is operated by electromagnets, current for which is obtained from the regular batteries, and is controlled by a switch attached to the steering wheel. When a motorist approaches a street intersection and desires to turn to the right, for example, he indicates this to the traffic officer, or others in the street, by pointing the arrow to the right. At night the device is illuminated from within. At the head of the arrow is a red lens and at the tail a green lens so that in the darkness there may be no confusion as to the position of the indicator.



Guess Who's Here: That Is One of the Ways Those Participating in a Cotillion of Advertising Characters of National Renown Helped to Make the Evening an Unusual and Lively One

TOTS AND GROWN-UPS OF AD WORLD IN LIVELY GAMBOL

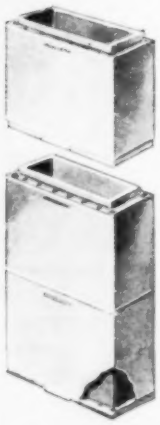
One of the country clubs in a Chicago suburb recently entertained its members and guests with a most interesting cotillion. All of the participants appeared costumed to represent advertising characters of magazine, newspaper, and billboard fame. Nearly all of the well-known children and grown-ups of the advertising world, even those of dusky hue, unconventional attire, and bygone days, were impersonated. Obviously the evening proved one of rollicking fun, so refreshing a departure was it from the conventional affairs that repeat themselves throughout the social seasons year after year. No one, unless appropriately costumed, was permitted on the floor until a late hour. Thereby the spirit of the frolic was carried out without being marred by the presence of evening apparel. So successful, and so simple to execute, was this convention of trade-mark characters, that it seems to offer unlimited opportunities for use elsewhere. Prizes for the best make-ups, as well as for the winners of possible guessing contests, are ideas that might be incorporated.

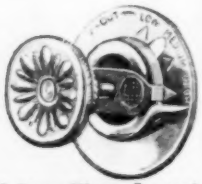
HAND-MADE HORSESHOES AS GOOD-LUCK PIECES

The hobby of an expert horseshoer in Martinsburg, Pa., is the making of miniature horseshoes which are scarcely larger than a dime and weigh about six grains. They are of steel and are hammered out with great skill. Their exact size is shown in the accompanying illustration. The maker of these tiny emblems of good luck has presented one to each crowned head of Europe and to a large number of noted persons in this country. The usual reward for each gift is an autograph letter. In the course of years the smith has made a large and interesting collection of autographs from these letters of thanks.

Only by Costuming to Impersonate Some Character of "Advertising Section" or Billboard Fame could One Appear on the Floor at the Club While the Gambol Was at Its Height

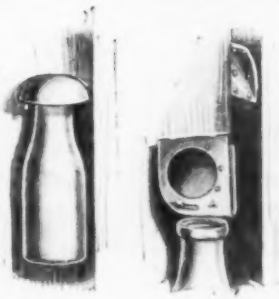
SOME NOVEL AND LITTLE-KNOWN ACCESSORIES



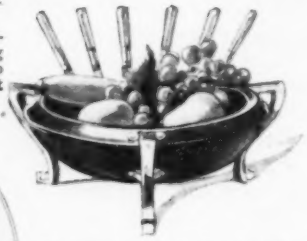


Oil-Stove Flame Control Keeps Wick at Whatever Height It is Set, Simplifying Heat Regulation. Three-Burner Stove, $13

Attached to Outside of Door, This Holder Prevents Theft or Contamination of Milk After Bottle is Delivered



Steel Tape with Self-Holding Reel. Ring End of Ribbon Also Has Gripping Point



The Joints of This Furnace Pipe are Self-Locking, so the Expense of Soldering is Eliminated and the Labor Cost Cut When It is Installed

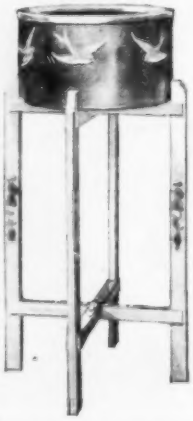
Patented Wire Handle for Milk Bottle That Enables Latter to be Hung Out of Reach of Animals When Delivered. Can be Made for 15 Cents a Dozen

Mahogany Fruit Bowl with Removable Glass Lining and Set of Pearl-Handle Knives. Price Is $11

Suction Cup Worn on Thumb to Assist in Holding Book or Magazine Open without Tiring Hand. Available for 10 Cents

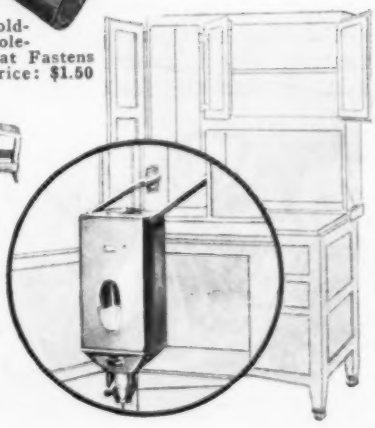
For Nursery or Toilet, Scales of Adequate Capacity and Small Size. A Revolving Dial Is Visible through a Glass Aperture in Top of Case. Price: $10

Bluebirds and Frogs are Used in the Decorative Scheme of This Attractive Aquarium and Stand Intended for the Nursery



For the Small Folding Camera, a Sole-Leather Case That Fastens to One's Belt. Price: $1.50

Double Pans for Baking Bottom Pie Crust Separately Before Filling is Put In. Makes Pastry Light, Flaky, and Greaseless. Price 35 Cents



This Kitchen Cabinet is Supplied with a Flour Bin That may be Lowered in the Convenient Manner Shown When It Is to be Filled. Price $39

Felt Slippers That may be Worn in Two Styles, as Illustrated, According to the Demands of the Occasion. For Women: $2.25; for Men: $2.50

Dainty and a Bit Unusual Is This Sewing and Knitting Basket of Plaited Raffia. It is Lined with Silk and Priced at $6.75

New Type of Holder Which Permits a Pen to be Inserted or Removed without Trouble

When It is Needed for Removing Spots, Benzine Feeds into the White Tufts from a Reservoir in the Back of the Clothes Brush. Price $1

For the Girl Who Drives a Car the Convertible Khaki Suit Shown Above Offers a Suggestion. In London It is Sold at About $15

With Space within It for a Small Photograph: A Signet Ring That Is Uncommon

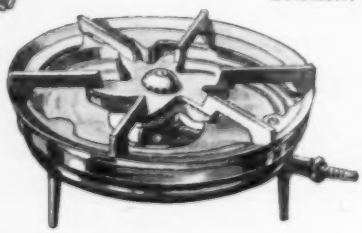
Attractive in Color and Odd in Design, a Whisk-Broom Holder That Conceals. Offered at $3.75

With This Device It Is a Simple Matter to Wind the Bobbin of a Tatting Shuttle. The Price Is 15 Cents

Folding Knife and Fork That Nest with a Spoon and Fit within a Leather Case. Price $3.25

English Workbasket Attractively Fashioned and Tastefully Lined in Silk of Pleasing Color and Pattern. Price, at Leicester, About $4

Intended for Open-Air Sleeper, a Night Robe with Warm Pockets for the Feet. It may be Had with or without the Hood at Prices Ranging to $5



Fitted with a Special Fuel-Conserving Burner and Supplied with a Drip Pan, a Hot Plate for Gas Users. In the Butler's Pantry It Is Especially Useful. The Price Is $1

BREATHING MASK DESIGNED AS DISEASE PREVENTIVE

To provide a means of safeguarding against the transmission of bronchial and allied diseases, a respiratory shield

When Worn by a Dentist or a Barber the Respiratory Shield Lessens the Danger of Either the Operator or the Patient Breathing the Foul Air Exhaled by the Other

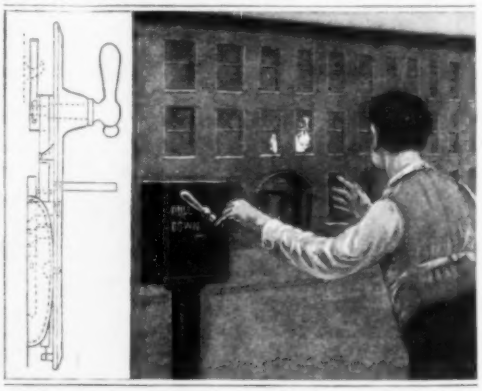
is made for barbers, dentists, and others whose work brings them in close contact with many persons daily. The device, which is made of aluminum and celluloid, fits over the nose and has two air passages with openings near the ears of the wearer. In inhaling and exhaling, air is drawn and discharged at the sides of the face instead of at the front. Provision is made within the shield for holding cotton saturated with disinfectant, so that the air exhaled from the lungs is sterilized as it is discharged, and that drawn in by inhalation purified before reaching the nostrils.

BIRD FLIES LONG DISTANCE WITH ADDRESS

A rancher living near Red Lodge, Mont., last August brought down with his rifle a large bird, probably some species of hawk, which was flying over his place. On picking up the creature he discovered that it had been stunned by the shot but was otherwise uninjured. Instead of killing it he tied to its neck a little bottle in which he sealed a paper bearing his name and address. Two months later a letter came from Bogota, Colombia, South America, signed by one Luis Felipe Rulda, saying that he had shot the bird carrying the Montana man's address. Red Lodge and Bogota are considerably more than 3,000 miles apart by a direct air route, and this incident shows in an unusual and striking way what great distances birds travel.

FIRE-ALARM BOX DESIGNED TO BE MEDDLER-PROOF

A special fire-alarm box has been invented by a Philadelphia municipal employe, the purpose of which is to prevent malicious or mischievous persons sending in false fire alarms. The box requires no key and is equipped with an outer and an inner door, both of which must be opened before an alarm can be turned in. The outer door is unlatched by pulling down a lever which serves as a handle and is held in position by a spring within the box. This lever operates a simple mechanism that rings a big gong fastened to the inside of the door. Hence the door cannot be opened without sounding this gong, the noise of which is very apt to summon a policeman or passer-by. Persons inclined to send in false alarms purposely will not be apt to take chances with this device.



A Fire-Alarm Box so Constructed That It cannot be Opened without Ringing a Big Gong Fastened to the Inside of Its Outer Door

SPORTSMAN'S CHART SHOWS GAME LAWS SIMPLIFIED

On the back of the hunting licenses issued by the state of Wisconsin has lately been printed a chart which shows in a very clear and simple manner the open and closed seasons for game to be found in the state. The names of fishes, birds, and beasts are listed in a column at the left of the chart, and following each are 12 small squares representing the 12 months of the year. The months or portions of months in which it is lawful to hunt or fish the creatures named are indicated in white, while all the rest of the squares are black. At the right of the squares are data about the bag limit for various kinds of game. Other information is given below. Formerly the licenses had no charts, the dates for the various open seasons being stated in printed form. In addition to the diagram is a table showing the time of sunrise and sunset for each day in September, October, and November, hunting and fishing being unlawful when the sun is below the horizon. Charts similar to this are used in Europe.

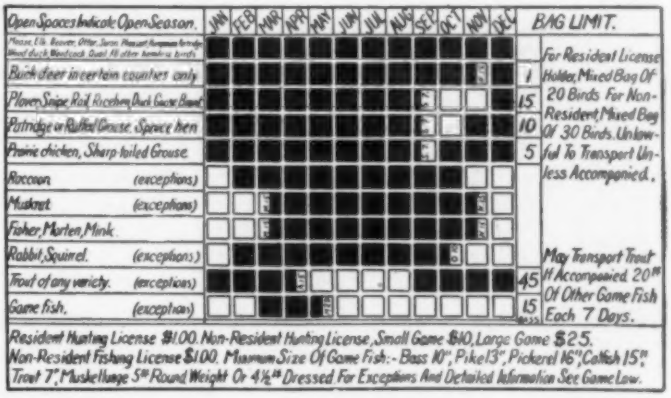
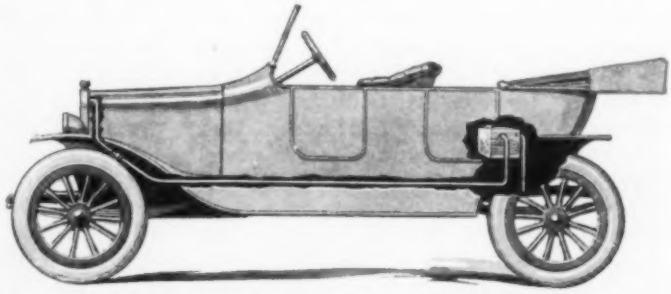

Open Spaces Indicate Open Season.
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
BAG LIMIT.
Buck deer in certain counties only
1
Holder, Mixed Bag Of
Plover, Snipe, Rail, Ricebird, Duck, Goose, Brant
15
20 Birds For Non-
Partridge or Ruffed Grouse, Spruce hen
10
Of 30 Birds. Unlaw-
Prairie chicken, Sharp tailed Grouse.
5
ful To Transport Un-
Raccoon (exceptions)
less Accompanied.
Muskrat (exceptions)
Fisher, Marten, Mink
Rabbit, Squirrel. (exceptions)
May Transport Trout
Trout of any variety. (exceptions)
45
If Accompanied 20"
Game fish. (exceptions)
15
Of Other Game Fish
Each 7 Days.
Resident Hunting License $1.00. Non-Resident Hunting License, Small Game $10, Large Game $25.
Non-Resident Fishing License $1.00. Maximum Size Of Game Fish:- Bass 10", Pike 13", Pickerel 16", Catfish 15",
Trout 7", Muskellunge 5" Round Weight Or 4½" Dressed. For Exceptions And Detailed Information See Game Law.

Chart Which Appears on the Back of the Wisconsin Hunting Licenses, Showing the Open and Closed Seasons for Various Kinds of Game

WATER SYSTEM KEEPS CAR RADIATOR WELL FILLED

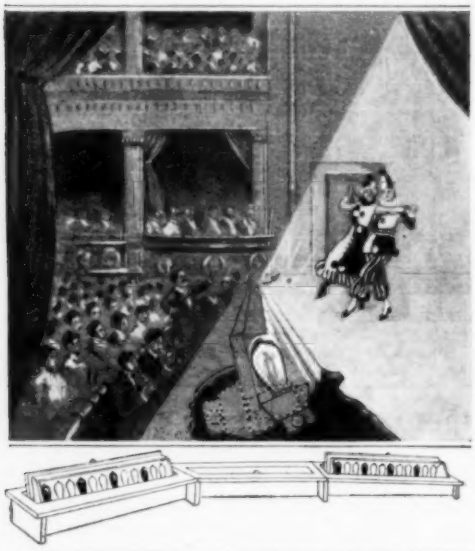
With a view to preventing the overheating of an automobile engine due to lack of sufficient water in the radiator, a water system has been devised which keeps the radiator full at all times. The system does not require refilling, except perhaps after a long interval, and can be installed in any car. The apparatus consists of a tank containing a condensing coil, which is installed under one of the seats or on the running board, and is connected by a copper tube with the overflow of the radiator. After connections have been made the radiator is filled with water and the tank filled halfway, and all caps are screwed down tight. On high speed or when climbing a hill, the water heats and expands quickly, causing the steam and water to flow through the copper tube into the condensing coil and tank. When the speed of the engine lessens and the water cools, the vacuum created draws the water back into the radiator, which thus is kept full at all times regardless of changing conditions.



A Water System for Automobiles of Any Make Which Keeps the Radiator Well Filled and Requires No Refilling

DISAPPEARING FOOTLIGHTS FOR SCHOOL OR CHURCH

Footlights especially adapted to meet the requirements peculiar to the platforms in schools, churches, public



When Not in Use These Footlights may be Turned Down so That the Platform is Not Obstructed When Used for Other than Entertainment Purposes

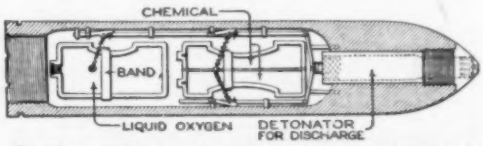
halls, or theaters also used for other purposes, are being made in sectional form. In addition to providing efficient illumination when in use, they have the advantage of being out of the way when not needed, and when a platform is being employed for other than entertainment purposes. The sections are inserted in a gutter cut for them in the floor, their tops, when turned down, completely covering the space and forming an inconspicuous, solid panel that is flush with the surrounding platform. Each of these covers is hinged so that it may be turned up somewhat like a trapdoor. The lamps, arranged in galvanized-iron reflectors attached to the under side of the panels, are brought into position and raised a trifle more than three inches above the floor when this is done. The sections are made in lengths of from three to five feet, and are provided with either single or double rows of lamps.

OXYGEN OBTAINED FROM AIR WITH NEW CATALYZER

From an authentic source it has been learned that a French authority has produced a chemical compound which, when maintained at a certain high temperature, readily absorbs oxygen from the atmosphere and liberates it upon being subjected to a current of superheated steam. Several catalytic agents of this kind have been found commercially impracticable, but considerable importance seems to be attached to this latest method of tapping the world's storehouse of oxygen. It is understood that the compound consists of a plumbate and a sodium permanganate, the former salt preventing the mixture from losing its porous consistency. Air, freed of carbonic acid, is directed into a chamber containing the catalyzer. Oxygen is absorbed and the nitrogen expelled. After air has been blown into the tank for a few minutes, the supply pipe is closed and superheated steam turned in, liberating the element, which is collected in a gasometer. Since the chemical absorbs and liberates the gas at the same temperature, the operation is a quick and economical one.

COMPRESSED-AIR GUN FIRES LIQUID-OXYGEN SHELL

As a result of the examination of a rather new type of high-explosive artillery shell invented by a youthful worker in an ammunition plant at Dayton, Ohio, the War Department has become sufficiently interested to schedule the weapon for thorough tests. Until these have been made, the actual merits



The Diagram Shows the Design of the Projectile and Indicates How Its Internal Mechanism is Operated

of the projectile will be an unknown quantity. Its character is interesting

enough, however, to be worthy of note. The bursting charge, instead of being black powder, or some other common explosive, consists of certain chemicals and liquid oxygen held in separate chambers. When these are united, by means of a lever and spring mechanism actuated by what is apparently a percussion detonator, the chemical reaction results in an instantaneous explosion. Another important thing is that compressed air, not powder, is used in firing the shell from a gun. A six-inch projectile of this type weighs 72 pounds.

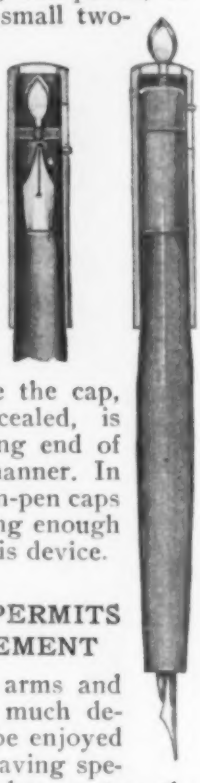
HOW WEIGHT OF ENGINES IS BEING LESSENED

One of the problems which has arisen in connection with the great increase in the size and power of locomotives has been how to lessen the tremendous stresses produced by the reciprocation, or revolution, of various heavy parts. In at least one type of powerful engine constructed in recent years an attempt was made to counteract these stresses by especially constructed counterweights. This effort was pronounced unsuccessful in many important respects, because it subjected the engine, and also the track, to new but equally serious strains. In recent months engine designers have turned their attention to the question of lighter construction. The use of forged and rolled-steel pistons has been proposed as one means of securing the desired lightness without sacrificing strength. These pistons are made solid and are cut with one or more dovetail grooves in the face, in which are inserted segments of malleable bearing metal, that is hammered firmly into place. Another means of lightening reciprocating parts of big engines has been to use hollow piston rods.

¶ During the past winter, when there was a shortage of fuel in many places, a manufacturing plant in Stoneboro, Pa., met an emergency by having coke shipped to it by express. One consignment weighed 8,100 pounds.

STEEL ERASER NESTS IN FOUNTAIN-PEN CAP

A recently patented eraser for the cap of a fountain pen, ink pencil, or the like, consists of a small two-edged blade mounted on a plunger. A slit is cut in the side, and another in the end, of the cap to be fitted with this device. The blade is nested in the cap so that it can be pushed in or out through the end slot by means of a knob that extends through the side slot. When the pen is not in use the cap, with its eraser concealed, is placed over the writing end of the pen in the usual manner. In some cases the fountain-pen caps now in use are not long enough to be provided with this device.



NEW GOLF COAT PERMITS FREE ARM MOVEMENT

Free action of the arms and shoulders, something much desired by golfers, can be enjoyed if one wears a coat, having special sleeves, which has been put on the market recently by a Detroit firm. The sleeves are attached at the shoulders and back by means of plaits which automatically fold inward when not expanded. When an ordinary coat is worn, a full swing of a golf club causes the garment to bind across the shoulders, while with this coat there is entire freedom of movement. In design the article resembles a Norfolk coat. The plaited inserts are so made as not to seem bulky. The garment is suited to motoring, trapshooting, and other pastimes, as well as golf.

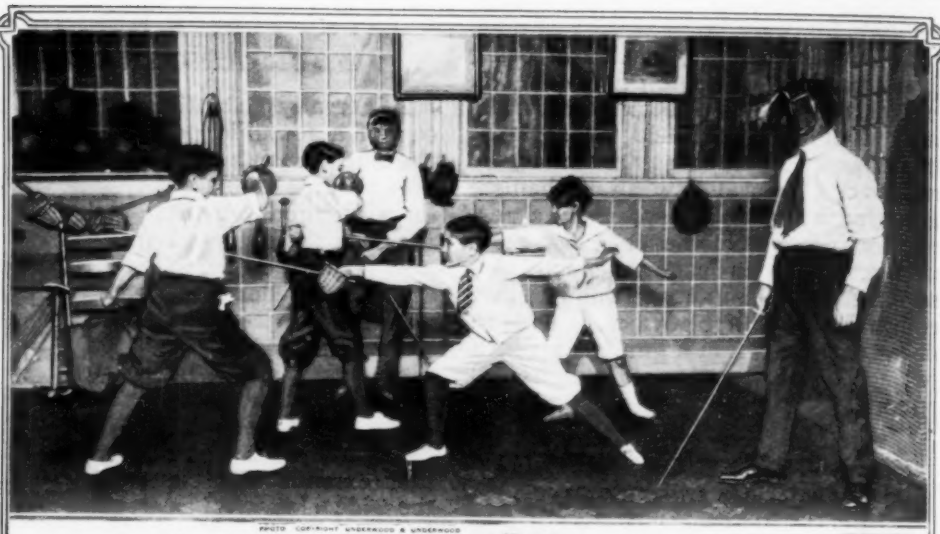


PHOTO COPYRIGHT, UNDERWOOD & UNDERWOOD

A Big Eastern Hotel Has a Gymnasium on Its Roof, and Boys Who Happen to be Stopping at This Hotel with Their Parents can Go Up There and Play. The Young Guests Shown Above are being Taught to Fence

COPYRIGHT, BOSTON PHOTO NEWS CO.

This Is Elva Gowen, a Little Red Cross Girl—Pretty Nearly the Youngest in America. She Is Only Three Years Old, but When the American Red Cross Had a Big Campaign in Boston for Members She Signed an Application Card All by Herself

The Little Maiden at the Right Wanted to Look at the Ships Far Out on the Ocean but She Was so Small and the Telescope Was so Big That She Had to Stand on a Chair to Do It

Chin Chin Is a Baby Elephant Who Plays in a Theater and in One Act Has to Stand on Some Ice. This Is Too Cold for Him and So These Men are Measuring Him for Shoes to Protect His Big Round Feet

UNUSUAL EVENTS OF INTEREST TO THEM

In Spain Boy Scouts are Taught the Same Drills American Boys Learn. Two Young Princes Belong to the Spanish Troop Shown Above. They and Their Comrades are Giving an Exhibition for Members of the Royal Family

This Checkered Schoolhouse Is Near Ashville, New York. Some Folks Wanted It Painted One Color, It is Said, and Some Another. So It was Decided to Use Both Colors

A Whittling Club in Portland, Oregon: The Man in the Group Is an Expert at Whittling, and Likes to Show the Boys How to Use Their Jackknives. Some of the Objects They have Carved are Shown

SANITARY NECK PROTECTOR FOR USE IN BARBER SHOPS

A sanitary bib or protector has been designed to be worn about the neck of a person being barbered, the special features of which are that it prevents hair from falling inside the clothing at the neck; and it is made of washable material so that each person may be provided with a clean protector. The article is really composed of two bibs of similar size and shape attached to a single collar band and having free ends that interlap at the front. The band is provided with several clasps so positioned that the protector can be adjusted to any desired size. The apron thrown about the person wearing the bib is tucked in between the cloths.

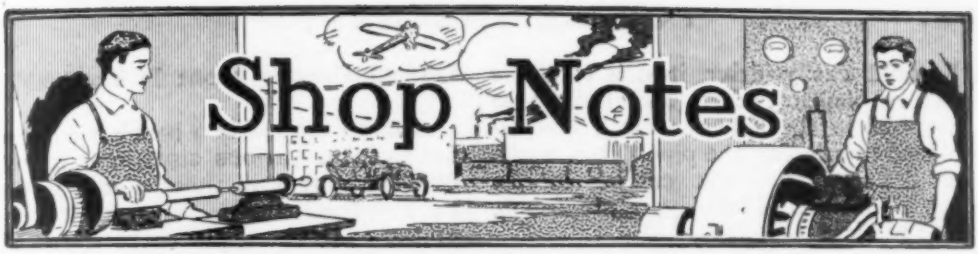
VOCATIONAL TRAINING FOR MEN IN THE ARMY

Vocational training in the army, according to the 1916 report of the secretary of war, is to be given added emphasis. The recent National-Defense Act provides that opportunity shall be given soldiers in active service to receive educational instruction that will increase their military efficiency and enable them to return to civil life better equipped for industrial, commercial, and general-business occupations. Many men enlist in the army for but a single term and then, on returning to civil life, find themselves handicapped as compared with young men who have given all their time to their chosen work. Particularly in the stations of the Coast Artillery substantial progress has been made in the matter of educational work, and it is predicted that a mode of army life having many desirable features will be developed.

SCHOOLS INSTRUCT PUPILS IN CIVIC BETTERMENT

Better citizens and an improved city are apparently the aims of educators at Des Moines, Ia., where boys and girls are being given first-hand insight into the commonplace problems of civic management. A thousand or more of the pupils attending three local high schools have been banded into a quasi organization known as the Improvement League. It is a part of their routine work to act as sanitary inspectors, and under the supervision of their instructors visit scores of places about the city in quest of unhealthful and detrimental conditions. Garbage disposal and the work of the health and police departments have been studied, poor sections of the city visited and housing conditions investigated, and bakeries, groceries, and other food-distributing business places inspected. When either unsavory or particularly commendable situations are found, photographs are taken, notes made, and reports filed with the teachers.

Four Des Moines High-School Girls Taking Notes on the Sanitation Conditions Found in a Hollow in Close Proximity to Residences



Fence Extension at Tidewater Stream

By B. FRANCIS DASHIELL

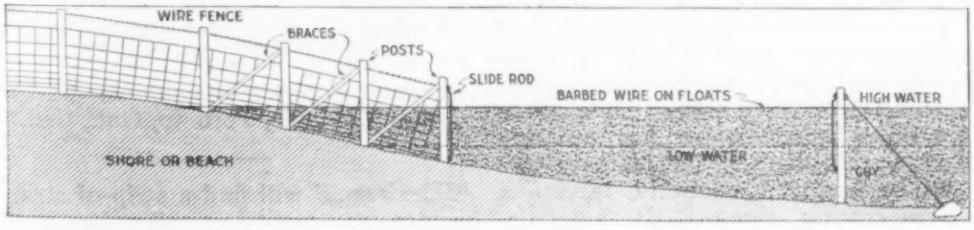
PREVENTING stock from passing around the end of a fence between adjoining fields at a tidal-river bank proved difficult until the fence extension, shown in the sketch and the diagram, was built. It adapts itself to the varying heights of the water, and may even be used in a lake, or a river of not too swift current and with little floating debris, to meet the varying depths of the water in different seasons.

The Barbed Wire is Supported by Floats and Accommodates Itself to the Changing Water Level

A fence of woven wire, graded down to the bottom to keep out smaller stock, was built to extend a short distance from the shore line at low water. A post was set, about 25 ft. beyond the last fence post, so that it projected above the surface at high water, and was guyed strongly. A slide rod of round iron was fitted to each of these posts, as shown in the diagram, being made long enough in each case so that the ends extended beyond the limits of the water's vertical movement. A barbed wire was fitted with suitable floats of wood, and provided with rings to engage the slide rods. It was stretched into place as shown, and was made free to float easily with the change in the water level.

Planting Bulbs Conveniently

To set out a large number of bulbs is quite a job, especially when they are to be planted in a lawn which should not be injured. I used a 2-in. iron pipe about 2 ft. long, with the end ground sharp, to cut the holes for the bulbs. A mark was painted on the pipe, 4 in. from the cutting end, so that

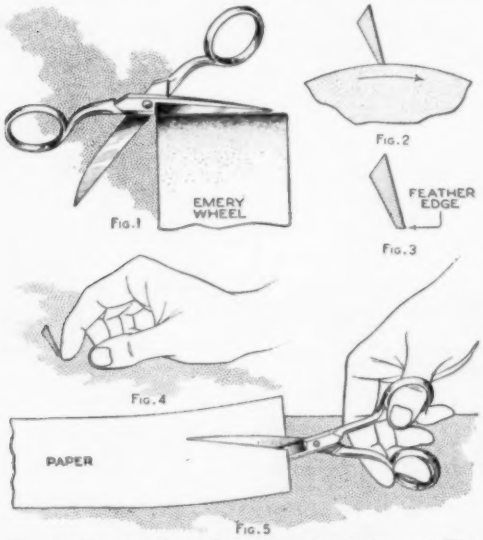


Sectional Diagram Showing the Arrangement of the Fence, Posts, and the Barbed-Wire Barrier

I could easily drive it down to the proper depth. After the bulb was dropped in the hole the earth was replaced by rapping the pipe. This necessitated only a slight cutting of the lawn.—A. E. Holaday, Naugatuck, Connecticut.

Sharpening Scissors on a Grinding Wheel

Scissors may be sharpened quickly and effectively on a grinding wheel,



The Blades are Ground to a Feather Edge, and This is Removed by Cutting Carefully into a Piece of Paper

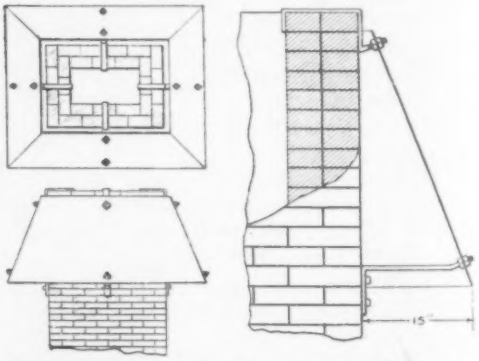
and this method is especially useful where several pairs are to be put into shape. Hold the scissors on the wheel, as shown in Fig. 1, the direction of the wheel being as indicated in Fig. 2. A feather edge, or extension, will be produced, as suggested in Fig. 3. Test the edge to make certain that a slight feather edge is ground throughout the cutting edges of both blades. This may be done by passing the finger nail along the edge, as in Fig. 4. Then remove the feather edges by using the scissors in cutting paper; apply oil to the edges before closing them or using them in this manner. The feather edges will be removed smoothly, leaving a sharp cutting edge.—R. B. S., Philadelphia, Pa.

Hinged Drawer Front Is Convenient

A large drawer in a bench was used for tools of various sizes, and it was difficult to remove those placed in the back of the drawer. As a result most of the tools were placed in the front part, often making it inconvenient to open the drawer. The front of the drawer was arranged to swing forward on hinges, and compartments were provided so that the tools had to be put in carefully. This increased the usefulness of the drawer and made it easier to get at the tools.—Charles C. Brabant, Detroit, Mich.

Hood on Chimney Increases Draft

Large smokestacks are often provided with an arrangement near the top to increase the draft. I devised the one shown in the illustration for use on a residence chimney, and it gave good results. A hood of sheet metal was built around the top of the chimney, flaring out to a spread of 15 in. from the bricks, and with an opening of about 3 in. at the upper end. The resulting draft through the hood has a tendency to draw the air and smoke up out of the



This Hood on a Chimney Increases the Draft and Tends to Overcome Down Draft

chimney, counteracting down draft.—James E. Noble, Toronto, Ont., Can.

¶ Draftsmen will find a strip of string solder convenient as a spline for laying out irregular curves

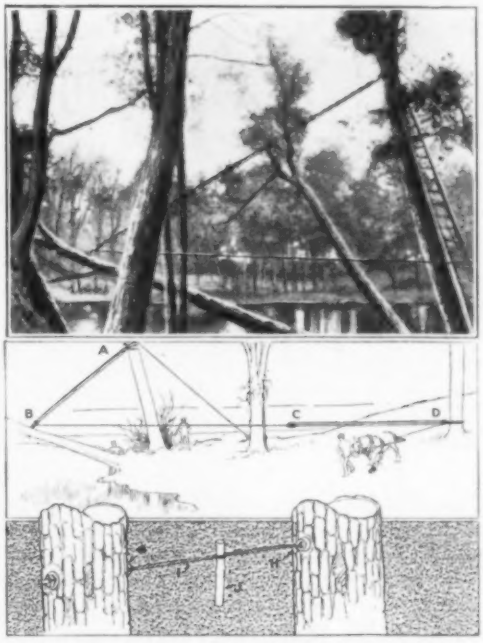
Hardening Small Carbon-Steel Tools

Special care must be taken in the tempering of small tools of carbon steel. A small gas furnace, inclosed, with a chamber for the heating of the tools, is desirable, but a coal or coke fire properly banked is satisfactory. The fire must be burned down to a bed of live coals, and it is best to insert a section of tubing into the fire to protect the tools from the direct blast. The quenching heat may be determined accurately by instruments, but where these are not available, the use of a magnet is suggested. When the magnet no longer has an attraction for the steel being heated at the part in the fire, the proper point for quenching may be determined by permitting the steel to remain in the fire a few moments longer. The point at which the magnet ceases to attract is about 1,425° F., and the best heat for tempering is 10° above that temperature.

Cracked and damaged tools in the hardening process frequently result from the failure to relieve the strain on the steel after quenching, and the moment that it has cooled sufficiently to harden. While still grasping the tool in the cooling bath, the instant that the tremor from the sudden plunge stops, the piece should be withdrawn quickly, and permitted to cool in the open air. The steel will still be too hot to hold in the hand. This is only necessary, of course, when the steel is not to be drawn to temper on the original heating.—A. Dane, Pottstown, Pa.

Saving a Fallen Tree at a River Bank

Continued high water softened a river bank in a park, so that several trees toppled over into the water for want of good root anchorage. A willow at one point was especially desirable, and it was brought back to its former position by the method described. High up on the trunk, well out over the water, a threaded eyebolt, B, was sunk into the tree, and a good bearing secured by means of a large washer screwed down tightly with a nut. This afforded a hold for a double



A Fallen Tree at a River Bank was Raised and Braced by the Method Shown

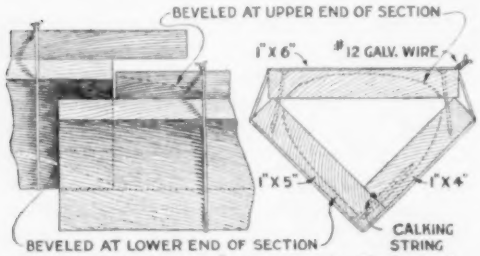
block, while a single block, A, was roped to a near-by tree. Then tackle was adjusted between the blocks, and the free end thereof hitched to a triple set of blocks and tackle, C and D, secured to a tree at some distance from the river bank. This gave a good purchase, and a horse hitched to this second tackle could exert a very heavy pull upon the fallen tree. By careful work the tree was brought to its former position without a mishap. The raised tree was permanently tied to the tree that held the single block by means of stout wire connecting the eyebolt G, in the former, with an eyebolt, H, sunk into the latter. This wire I was run through the eyes in four strands and twisted to the proper tension with a stick, J. The tree was also anchored to the base of a near-by elm.—C. L. Meller, Fargo, N. D.

¶Make it a rule to reset the tailstock on a lathe immediately on completing a taper job.

Gravity Water System for a Summer Cottage or Camp

By G. E. Kastengren

THE gravity water system described in this article and shown in the illustrations was built for a summer home in the Olympic Mountains. The principles underlying its construction, and the general details, may be used directly or with slight adaptation in various other mountain or rolling-hill regions, or other places where a suitable flow of water is available. The source of the water supply was a small spring-fed creek, with a minimum flow of 15 gal. a minute, and situated at an elevation of 800 ft. above the house to which the water was conducted, as shown diagrammatically in the large illustration. The water is conveyed a distance of 1,440 ft. and is stored in a 25-bbl. oak cask, obtained from a brewery for $15. This was set at an elevation of 92 ft. above the house, on a strong platform built of logs, across



Detail of the Sections, Showing the Method of Joining Them at the Ends

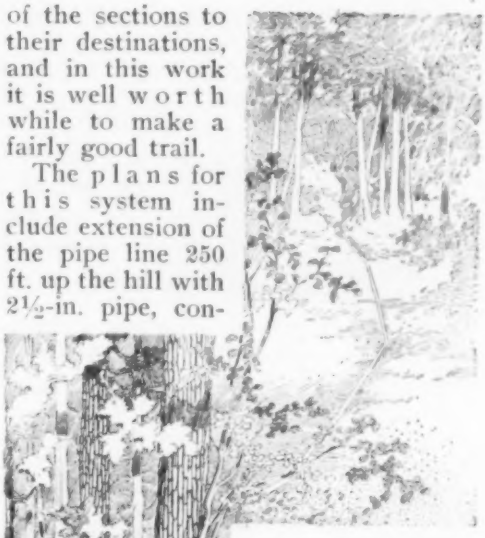
a gully, about 4 ft. deep and leading almost directly to the house. This made unnecessary a great deal of excavation otherwise essential, as an excellent trench was thus provided for the pipe line. The water is conveyed from the intake to the tank by means of a flume, constructed as shown in the detail sketch. Views of the flume and of the tank are shown in the photographs reproduced in the headpiece. A pipe line conducts the water from the storage tank to the house.

Galvanized-iron pipe, secondhand, was obtained for the pipe line and other pipe sections and fittings, 2-in. and 1½-in. pipe being used. It was conducted from the bottom of the tank, as shown, and joined with the usual unions. At the end near the house, a 1½-in. nozzle was placed, for fire protection and sprinkling. The joints were made with various fittings to accommodate the line to the ground, with a minimum of supports. A globe valve was fitted at the outlet from the tank and a ladder was provided in lieu of a depth gauge in the tank.

To convey the water from the intake to the tank, I devised a flume of the special type shown in detail, and it proved well suited to the conditions. It leads through a heavy forest of fir and cedar, and occasional windfalls, especially during the winter, are likely to break parts of it. It was therefore necessary to construct the flume so that it could be repaired easily and quickly. It is made in sections of 16-ft. length. They are not nailed together, but the lower end of each rests on the upper end of the next section below, and a broken section may thus be quickly replaced. Since the area for the passage of the water would be reduced considerably at the joints if they were set together as originally made, portions were cut away by beveling the adjoin-

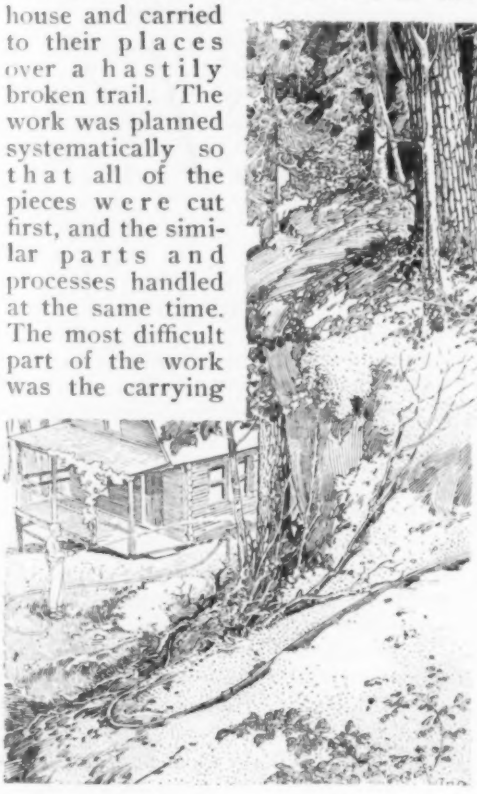
ing ends, as shown by the dotted curves in the detail sketch. The lower edge of the cover was beveled to a distance of about 3 in. at the upper end of each section. The upper edges of the trough were beveled similarly at the lower end of each section. The ends were telescoped, as shown, and the covers of the adjoining sections set to cover the joints on top. The lower portion of the flume was made of two strips, one 1 by 4 in. and the other 1 by 5 in., nailed together, and a calking string was inserted in the joint. The cover board is 1 by 6 in., and serves to brace the sections. It is nailed down and further reinforced by galvanized-wire stays, tightened around the sections as shown. No difficulty was experienced with the sagging of the sections as the cover and trough, joined rigidly, form a strong hollow beam. The capacity of the flume is about that of a 3-in. pipe, and 20 board ft. of lumber were required for each section.

The sections were all built at the house and carried to their places over a hastily broken trail. The work was planned systematically so that all of the pieces were cut first, and the similar parts and processes handled at the same time. The most difficult part of the work was the carrying of the sections to their destinations, and in this work it is well worth while to make a fairly good trail.



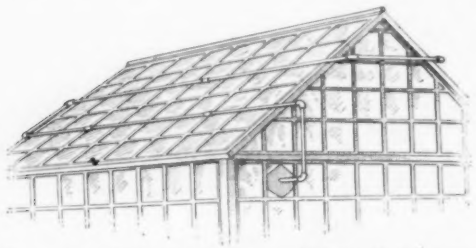
The Water is Conducted by a Wooden Flume from a Spring to the Storage Tank, and Then to the House by a Pipe Line

The plans for this system include extension of the pipe line 250 ft. up the hill with 2½-in. pipe, connected to a larger tank there. This will give a head of 255 ft., for the development of 500 watts of electric current, during the hours when lights or power are needed. A minimum flow of 25 gal. a minute is available for this purpose. The cask will be used in this arrangement as formerly, a ¾-in. pipe line being installed to conduct the water to the house. This will not interfere with the power line by reason of the use of a regulating valve, opened only when water is needed for the cask. The cost of this installation, exclusive of labor, was $109, and the investment has increased the utility of the place immensely, and enhanced its value probably $800. A valuable consideration also is the added security of the wooden buildings from the danger of fire.



Snow-Melting Device for Roofs

When three feet of snow fell in a region unaccustomed to heavy snow-

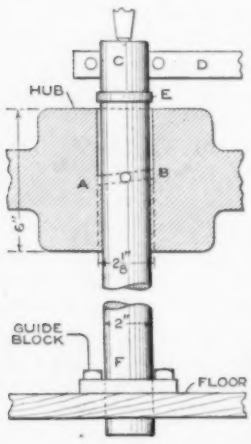


Damage to Glass Roofs was Avoided by Melting the Snow in a Heavy Snowfall as It Drifted on the Roof

falls much damage was done and several roofs collapsed under the strain. Many glass-roofed greenhouses suffered. The owner of several such buildings saved his property from damage by further snowfalls by extending the steam pipes that heated the interior, through the roof, as shown in the illustration. With a good head of steam in the boilers, he kept the pipes hot, and as fast as snow drifted on the glass roofs it melted away.

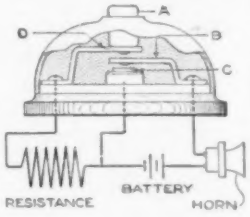
Reboring a Large Gear without Machinery

It was desired to rebore a gear, 40 in. in diameter, fitted to a 2-in. shaft, to fit a 2⅛-in. shaft, and the local shops were not equipped with machinery suitable for this work. The rigging shown in the diagram was set up, and the job completed in a short time with success, and without the use of ordinary boring, or special, machinery. The gear was placed on two strong shop horses, and bolted to the floor, leveled carefully, so that the bored bearing in it was vertical. A hardwood block was bolted to the floor directly below the bearing hole, and a 2-in. hole was bored into it. Strong braces were set against the gear. A vertical boring shaft was fitted to the bearing hole as follows: A 2-in. shaft, C, was bored to fit a 5/16 by 2⅛-in. piece of tool steel, tempered and ground, and set at an angle, as at A-B, so that the end A became a cutter. The lower end of the shaft was set in the hole at F, which extended through the floor. The inclination of the cutter gave the cutting edge a 1/16-in. lead, and the hole was bored true by centering the cutting bar at the beginning of the cut. A ring, E, 2⅛ in. in diameter, was fitted on the shaft and acted as a follower. Power was applied on the arm D, 5 ft. long.—L. M. Drake, Daytona, Florida.



Push Button Varies Tone of Electric Horn

In residential sections the loud blast from an electric automobile horn is an unnecessary nuisance, but on long stretches of country road, at sharp turns, or in crowded, noisy city streets a penetrating blast is often desirable. A push button designed to control the horn's tone at the operator's will can be constructed easily, as indicated in the diagram. The usual push button A has a contact point, C, and a spring-brass strip, B. When the button A is pushed downward, C and B make contact, and a circuit is established through the battery and horn. A second brass strip, D, similar to B, is added, and placed above B. A small resistance is then placed in series between C and D. The amount of this resistance can be determined by experiment. The horn is operated as follows: A pushes D against B, and a high-resistance circuit through the battery and the horn is es-



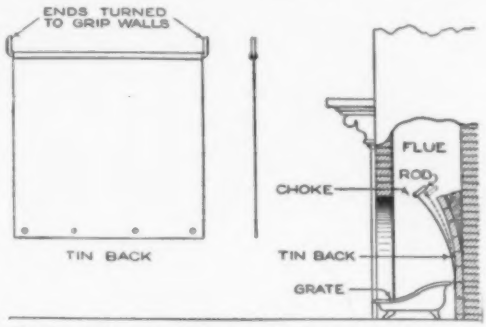
tablished. The horn then gives the subdued tone. A slightly harder push on A will bring B in contact with C, cutting out the resistance, and impressing full battery voltage on the horn. A full-toned warning will thus result.—K. M. Coggeshall, Webster Groves, Missouri.

Straightedge Arched for Leveling Concrete

When troweling the surface of a concrete walk, or similar area, many of the strokes start or end in the center of the panel. Care is necessary to prevent the center from becoming lower than the edges, forming a lodging place for water. If the straightedge, used to strike off a level surface before troweling, is arched, a level walk will be more easily obtained. The arching of the under side of the straightedge gives a slight crown, and subsequent troweling brings the surface down to a level.—J. J. O'Brien, Buffalo, N. Y.

Preventing Back Draft in Fireplace

If a fireplace smokes, or does not "draw" properly, the cause may usually be found in that the portion known as the choke is too large. To remedy this quickly and at slight cost a false back is provided in the fireplace, as shown in the sketch. A sheet of tin plate is fastened to the back wall, a few inches above the hearth level, and extended upward, on a slight forward curve, to a point about 2 in. above the lower edge of the facing. This sheet should be the full width of the back wall. At the lower edge it is nailed to the mortar and at the top it is fastened to a cross rod. Cut the sheet the width of the back wall of the fireplace, and of a length corresponding to the vertical distance to be covered, allowing 1 in. to be used for a loop on the cross rod. A right-angle turn of 2 in. is then made on each end of the rod, which is 4 in. longer than the width of the fireplace, forming a springing resistance against the walls. The lower edge of the apron is then nailed, the sheet of metal being curved as shown. The opening into the flue can thus be reduced in size as desired, by moving the

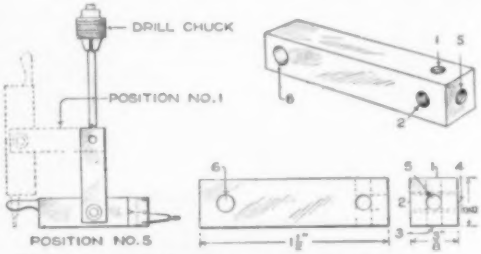


The Draft in a Fireplace may be Regulated to Prevent Smoking by Means of the Adjustable Sheet-Metal Guard

cross rod, care being taken to create just the necessary draft to prevent smoking.—Charles Alma Byers, Los Angeles, Calif.

Indicator Holder with Five Positions

Having purchased an indicator, I found that I needed a number of attachments to make any considerable use of it. These were expensive, so I made the holder shown in the illustration, and was able to do many kinds of work with it. It has five positions for the indicator, as shown by the numbering on the sketch. The holder was made of a ⅜ by ⅜ by 1½-in. strip of machine steel. The holes in it were tapped to fit a thread by means of which it was supported in its various

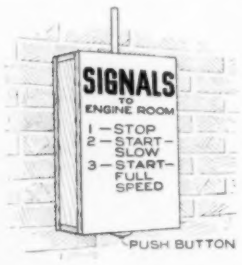


This Simple Holder Enlarged the Usefulness of an Indicator without Special Attachments

positions. The holder is fastened to the indicator by means of a thumbscrew set in hole No. 6.—Arthur Whittier, Norwood, Mass.

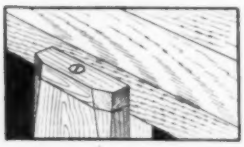
Safety-First Alarm System for Shops

In emergencies it is often desirable to stop the machinery in a shop quickly, and, if the establishment is a large one, a signal arrangement between the engine room and the shop is practical. Serious accidents or loss of life may thus be averted. A simple arrangement which any workman could use in an emergency is shown in the sketch. The box with its code lettered to be seen at a distance should be located so that it may be reached quickly, and painted a conspicuous color.—J. R. Minter, Washington, Ind.



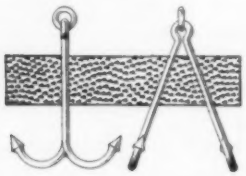
Auxiliary Vise Jaw for Holding Irregular Pieces

A block of hard wood, shaped to match the upper end of the vise jaw and pivoted at the center, as shown in the sketch, will add to the usefulness of many vises. The block will adjust itself to pieces of unequal width and will save needless wear on the vise, as the block may be quickly renewed when worn out.



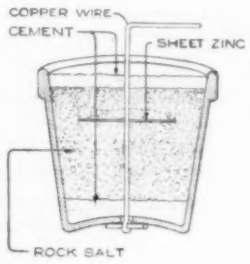
Anchor Bent from Round Bar

A form of anchor that can be made easily from a bar of round iron is shown in the sketch. The original was made of 2-in. bar iron, but the method of forming the anchor can be applied to smaller stock for use on a rowboat or other small craft. The ends of the rod are heated and upset by striking them on the end. They are then pointed as shown, and the bar is bent into shape with an eye at the top to fit a ring.—J. Harger, Honolulu, H. I.



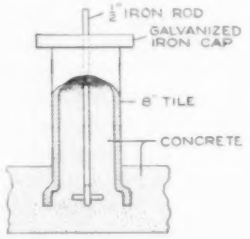
Electrical Ground Made of Flowerpot

A ground suitable for wireless apparatus, lightning arresters, and similar electrical devices, may be made quickly as shown in the sketch. The heavy copper wire of the ground is fitted into a large flowerpot, and a wire is fixed to its end to hold it in place. The bottom of the pot is covered to a depth of about 1 in. with cement. Rock salt is then poured in and a disk of sheet zinc is imbedded in it in contact with the wire. A 1-in. layer of cement is poured in on top. Salt will draw moisture and for this reason a ground made as described will give good results. The clay flowerpot tends to hold the moisture.—A. Gemmill, Ansonia, Conn.



Rodent-Proof Support for Corncrib

To prevent the inroads of rats and mice, and, at the same time, provide a substantial support, a foundation for a corncrib was made of 8-in. tile set in concrete, as shown in the sketch. The tile was placed with the flange down, and a ½-in. iron rod was imbedded in the concrete with which it was filled. A galvanized-iron cap was fitted over the top and the iron rod passed through it to form a substantial fastening for the sills of the crib.—R. W. Smith, Minneapolis, Minn.



Adaptation of Motorcycle for Home and Shop Use

By J. H. SEEGER

A MOTORCYCLE that is used only for transportation or pleasure jaunts is not giving the fullest service to its owner. By providing suitable rigging and devices, all easily made in the home workshop, I use my motorcycle the year round, for a large variety of home and shop duties. The arrangement shown in Fig. 1 permits the use of the engine for driving a cooling fan, an emery grinder, and an ice-cream freezer. Many other home and farm machines may be driven similarly. The work of wash day made lighter by the use of the motorcycle engine is shown in Fig. 2, and a detail of the driving pulley in Fig 3. The machine fitted to a truck for use on railroad tracks is shown in Fig. 4. The vehicle is not impaired for its ordinary use, and the devices used with it are quickly disconnected.

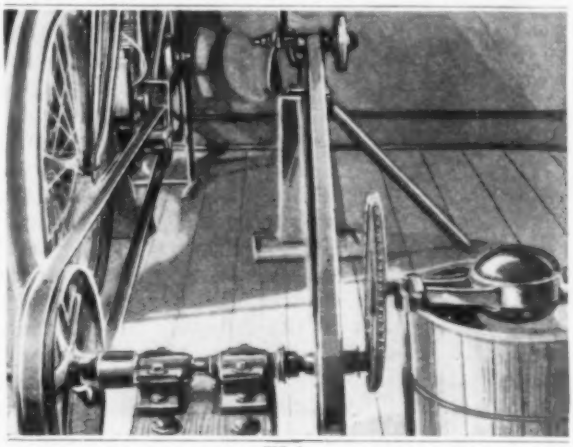


FIG. 1
Grinder, Fan, and Ice-Cream Freezer Driven by a Motorcycle Engine, the Speed Adjusted by Pulleys and Gears

The installation for the grinder and freezer was made in the shop. The grinder is a handy shop machine and is driven at great speed and with sufficient power for most ordinary grinding. The fan on the opposite spindle of the grinder is used to cool the engine when it is used for continuous duty on work other than the driving of the grinder. If it is desired to cool the engine while grinding, the fan should be incased for the safety of the operator. The freezer, or other light machine, such as a churn, is connected to a line shaft by gearing. Other suitable means of transmitting the power are readily installed. The drive pulley on the engine is 4½ in. in diameter, and the pulley on the line shaft 13 in. The drive pulley was supported by braces of strap iron, fixed to the engine as shown in the detail view.

In connecting the engine to the washing machine and the wringer, it is necessary to gear the speed down considerably, hence large pulleys are used, and a further reduction made between the line shaft and the pulleys on the shafts of the wringer and the washing machine. The pulley below the machine is 10 in. in diameter. In all of these arrangements, the motorcycle must be mounted on a strong rear-wheel stand, or other rigid frame, from which it may be released easily. If necessary, the frame may be bolted to the floor, as in the workshop installation. The sprockets, chains, and other machine parts used, were picked up from old machines, separators, farm tools, and similar devices, at practically no expense.

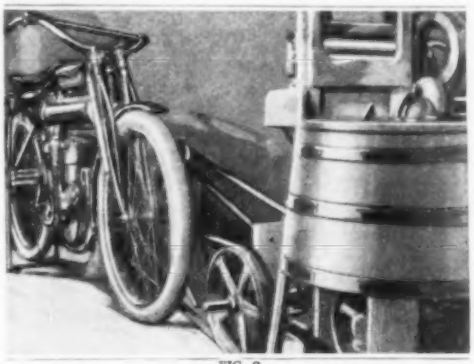


FIG. 2
The Work of Wash Day Made Lighter by the Belting of Motorcycle to the Washing Machine and Wringer

The car for use on railroad tracks is of simple construction. It will carry three workmen, and operates smoothly and speedily, even in bad weather. Three flanged wheels, like those commonly used on small hand cars, were used. An iron bar, fitted with a small roller bearing against the inner side of the rail, guards the motorcycle from slipping off the rail in taking a curve.

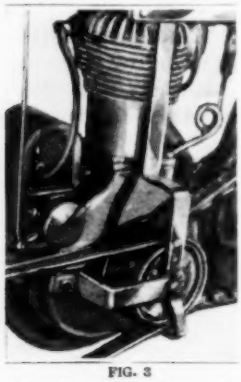


FIG. 3

The rear wheel only comes into contact with the rail, and furnishes satisfactory traction with the ordinary rubber tire. It can be raised to operate the engine, without traveling, by the usual stand. The car and the framework supporting the carrying rack are arranged to be set up or removed quickly for use with the motorcycle, by bolt fastenings. This enables the rider to travel a part of his journey on rail, and the rest over roads, in an emergency.

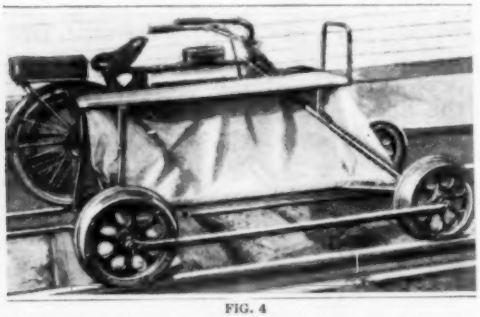


FIG. 4

Motorcycle Rigged to Run on Railroad Tracks and Accommodating Three Persons

---

CA piece of heavy cardboard, about 6 in. square and having a ½-in. hole through it, is useful in locating splinters or small particles of foreign matter in the hand. Hold the hand in front of a strong light and locate the splinter by observation through the opening.

Focusing and Caring for Headlights

The adjustment of headlights should be made at night and without interference from other light. The vehicle should be headed toward a wall, or other similar surface, with the lamps 10 ft. from it. If the lamps are properly focused, the light thrown on the surface will be in the form of a circle, about 3 ft. in diameter, and having a very bright spot in the center, 3 or 4 in. in diameter. When this is not the case, the lamps are out of focus and should be moved forward or backward in the reflectors. If they are too far back, the rays of light will diverge, so that a large area is illuminated, but the light will be unsatisfactory for driving; if they are too far away from the reflectors, the rays of light will converge, so that there will be excellent light, a few feet ahead of the car, but not satisfactory for driving.

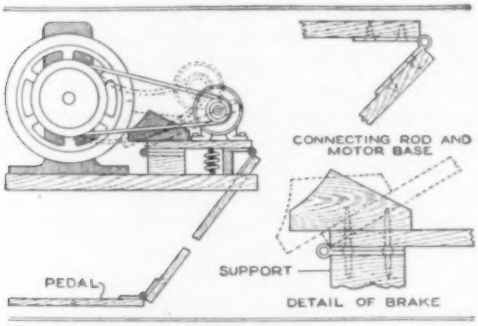
An adjustment of the lamps for maximum illumination on a point 150 ft. from the car will give good results for general driving. The two reflectors should be so adjusted that they will throw their light directly ahead of the car, and slightly toward the ground. Lamps having concentrated filaments are desirable, as a better focus is possible, in that the light is confined to a small spot. If the reflectors are dirty, they may be cleaned by rubbing them lightly with a piece of fine cotton dipped in alcohol. Rub from the outer edge toward the center or the reverse, never around the reflector.—P. D. Norem, Chicago, Ill.

Wire Substitute for Latticework

Fine galvanized-iron wire mesh may be used with good effect to replace old-style wood latticework in inclosing the lower portions of a porch, stairs, or similar places. It makes a satisfactory appearance, and if well painted, will last longer than wood. It is also easily fitted and fastened in place. Climbing plants are afforded a good hold, and the fine mesh keeps out small animals. —James M. Kane, Doylestown, Pa.

Motor Attachment and Brake for Sewing Machine

A small battery motor using a current of about six volts was fitted to a sewing machine and provided with a brake and pedal, as shown in the sketch. The arrangement gave thorough satisfaction and was constructed in a short time, with materials readily available. The motor was bolted to a wooden base, which was in turn connected to a block support with a strap hinge. A stop was provided to keep the base in a horizontal position, and a coil spring was fitted under it, to hold it down, except when the foot is pressed upon the pedal. The motor was belted to the pulley on the end of the spindle of the machine, and a brake pad of wood was fitted to the base, to engage the flywheel. The pedal is connected to the back end of the base with a hinge, and pressure upon it, in front of its pivotal point, causes the base and motor to be raised, releasing the belt and bringing the machine to a quick stop by the action of the brake. The machine may thus be stopped without shutting off the current to the motor, but a small switch should be mounted near the operator to control the current supply. A small transformer may be used to reduce 110-volt lighting current, or it may be supplied by a storage battery.

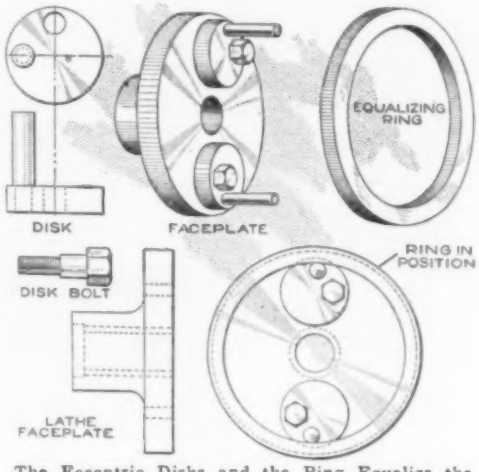


The Motor is Controlled by Pressure on the Pedal, the Brake at the Same Time Acting on the Flywheel

¶Always joint a saw to insure a straight cutting edge before filing the teeth.

Adaptable Jig for Turning Pulleys in a Lathe

After several castings for light pulleys had been broken while attempting to turn them up in a lathe by the common method of mounting them on an arbor and faceplate with a stud, the device shown in the sketch was made, and proved satisfactory. A faceplate was turned up and threaded to fit the lathe spindle. Two disks provided with studs, set close to their edges as shown in the detail sketch, were fixed to the faceplate with machine bolts, so as to pivot easily. They were mounted eccentrically. An equalizing ring was made and fitted over the disks and studs, as shown. The operation of turning up the pulleys was then carried out as follows:

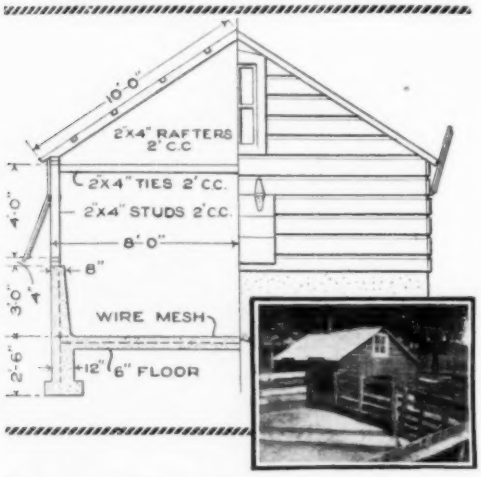


The Eccentric Disks and the Ring Equalize the Strain in Turning Up Light Pulleys in a Lathe

The pulley was mounted on an arbor and placed on the faceplate so that each of the studs rested against a spoke, with the ring in position. The pressure of the spokes against the studs forces them against the ring, which equalizes the strain, giving a uniform pull on opposite sides of the pulley. The faceplate may be used for various sizes of pulleys, by drilling and tapping holes at suitable distances from the center, to accommodate the studs. Three disks for very light pulleys may also be used.

Roofed Watering Tank of Concrete

A large concrete watering tank, having a frame superstructure over it, was found practical on an Iowa farm. Its large size enabled the farmer to use plenty of water in spite of adverse weather when the windmill could not be operated. The roof over the water kept it cool in summer, and aided in keeping the water supply pure. The original was made 16 by 20 ft., but the method of construction may be applied readily to smaller tanks.



The Concrete Watering Tank was Built at the Center of the Barnyard, Giving Access to Stock in the Various Sections

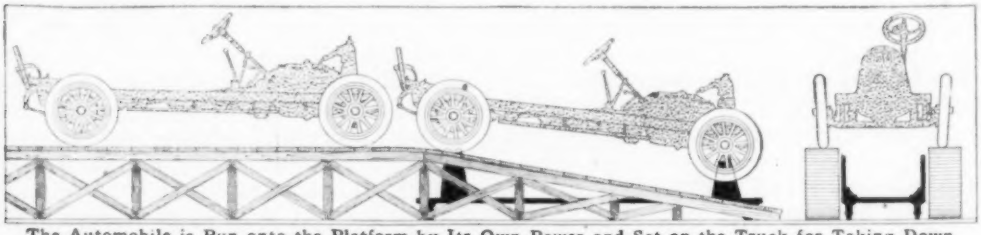
A strong foundation of concrete, having a 24-in. footing and a 12-in. wall, tapering to 8 in. at the top of the tank, was poured in forms and served as the tank proper. The 6-in. floor and the walls were reinforced with heavy wire mesh. The tank was made to extend 3 ft. above the floor level, and bolts were set into the top of it, to provide a fastening for the frame portion. The latter was made of 2 by 4-in. material, with double pieces for the sills. The rafters and other details are of standard construction. Windows were set in the gables, for light and ventilation, and several doors, to be raised in opening them, were fitted in the sides and ends. The sides and ends were finished with matched siding, set horizontally.

The openings are spaced in relation to the fenced parts of the barnyard, so that each type of cattle has separate access to the tank. The tank was set in the center of the adjoining sections of the barnyard for this purpose.

The top of the concrete wall should be leveled carefully, to provide a satisfactory foundation for the frame structure. The tank should be finished, especially inside, with a smooth coating of a creamy mixture of cement and water, three days after pouring the concrete in the forms, the latter being removed at that time. The intake and overflow pipes must, of course, be provided for when the forms are set up.

Platform Facilitates Taking Down of Automobile

A platform used in an automobile factory, and which has practical applications for use in repair shops and garages, is shown in the illustration. After the car has been tested and certain parts removed it runs onto the platform and down the incline, where it drops onto a truck, resting on its axles. The car uses its own power in this process, and the same platform is used to unload the chassis when it is painted and ready for the body, the process being reversed.



The Automobile is Run onto the Platform by Its Own Power and Set on the Truck for Taking Down before Painting the Chassis

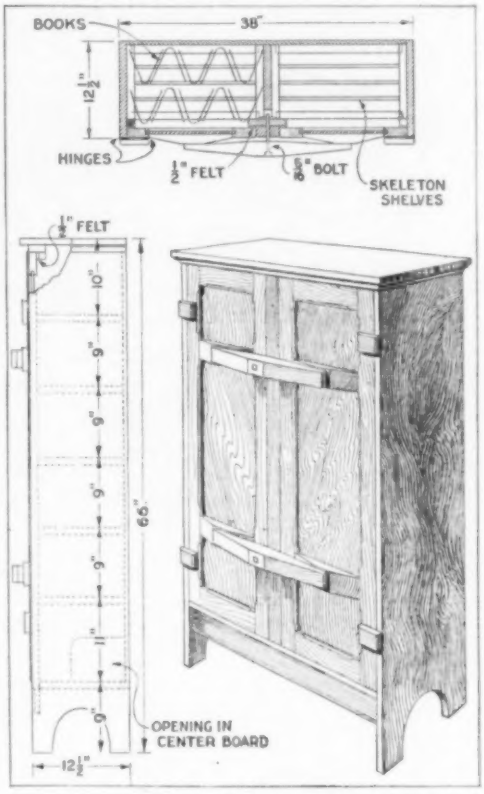
Indoor Air Supply for Furnace Heating Systems

Many hot-air furnace heating systems provide for two sources of fresh-air supply. In moderately cold weather an outdoor intake is used while during severe cold spells, or when the wind is in such a direction that it blows into the intake, air is drawn from a duct in the basement. The air taken in from this source is not desirable, hence a better plan of using already warmed air is to take it from a duct connected with the front hall, rather than the basement.

A Book Fumigator and Sterilizer

Of recent years public libraries and schools have come to realize the danger of books as germ carriers. In larger institutions, special rooms and apparatus may be fitted up for this purpose, but in smaller ones, sterilizing books is a problem. The book fumigator shown was designed so that an ordinary carpenter could make it at moderate expense, and is suitable for use in a large room without incommoding the occupants.

Excessive and continued heat provides a fairly certain method of sterilizing a book, but this treatment is so severe that the bindings are usually injured. If the books are placed as shown, in a suitable cabinet, with the covers spread apart so that the leaves swing free, and are then subjected to a strong fumigating gas overnight, excellent results may be obtained. The fumigator consists of a closely fitted cabinet, divided vertically by a central partition. The two doors are paneled, and each one carries two strong crossbars. Instead of being hinged directly to the cabinet each hinge is fastened to a square block, which in turn is hinged to the sides. This arrangement permits the doors being forced against a strip of felt extending around each door casing. The method of clamping the doors is shown. When not in use, the bars stand vertically. If more pressure is required, give these bars one or more half turns to the right. The inside space should be closely papered and the exterior



The Books are Arranged in the Cabinet with Leaves Exposed for Thorough Fumigation

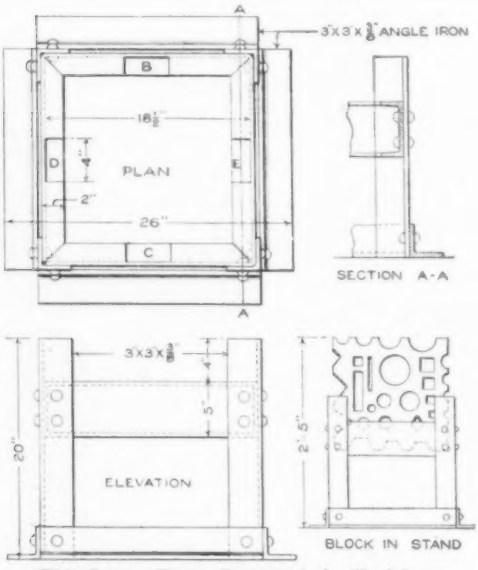
varnished, or shellacked. The shelves may be made adjustable, greatly increasing the utility of the cabinet.

To provide the fumigating gas, place a few spoonfuls of formaldehyde solution in a saucer, and just before closing the doors drop a little permanganate of potash or chlorinated lime into the solution, which will immediately generate a powerful germicidal gas. The common sulphur torch or formaldehyde generator involving a flame should not be used.—John D. Adams, Phoenix, Ariz.

¶Gasoline and kerosene used in mixtures should be kept well stirred because the kerosene will otherwise settle.

Base for Swage Block

The usefulness of a swage block is considerably increased if it is set upon a strong and easily portable base. In



This Strong Frame Increased the Usefulness of the Swage Block

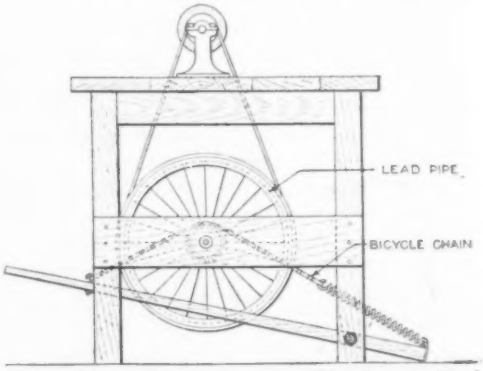
many shops this tool is set on a wooden block, or placed upon any makeshift available. I devised the base shown from 5-in. channel bars and 3 by 3-in. angle iron. The channel bar was mitered at the corners to form a frame, as shown in the plan. Four legs were riveted to it and braced at the bottom with angle iron. Portions were cut out of the upper flange of the channel bar, as at B, C, D, and E, to fit the block, in two positions. When it is desired to use it in a horizontal position, the block is rested on the channel-bar frame.—A. E. Dowden, Worcester, Mass.

Storage Areas Marked on Floors

The method used in a large warehouse to keep the piles of stored goods from encroaching on the aisle space is as follows: A white 2-in. stripe is painted on the floor bordering the space which must be kept clear, such as trucking aisles, approaches to fire exits, and valves controlling the automatic sprinkler system. Special attention is called to valves by lettering the name on the floor with a large arrow pointing to the valve.

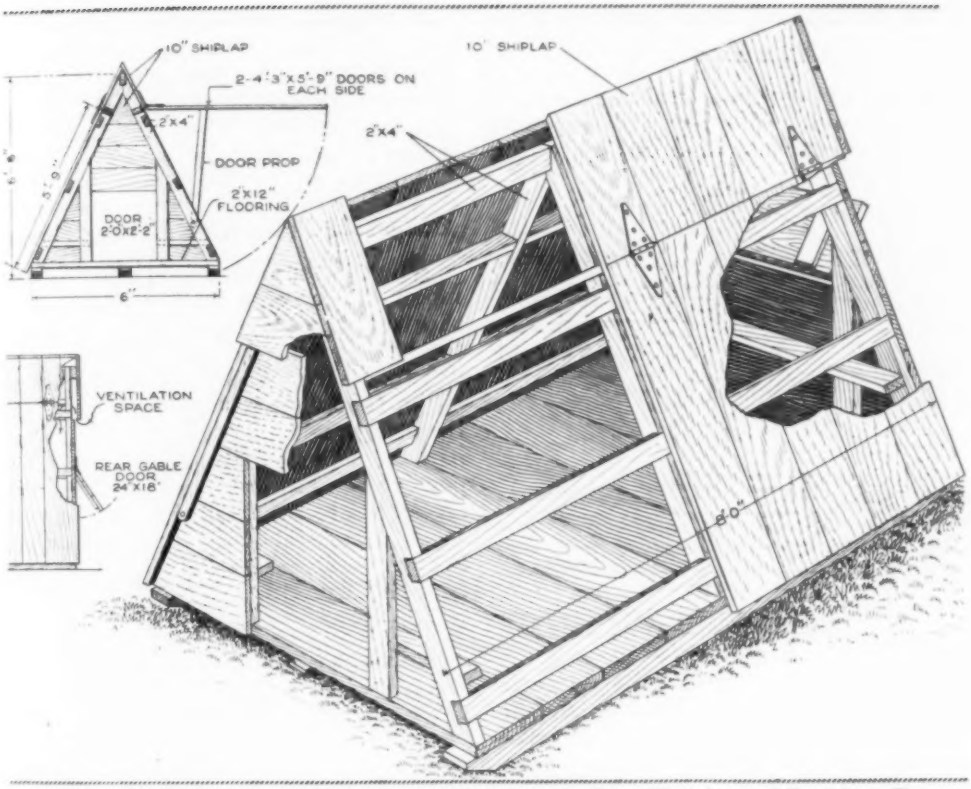
High-Speed Foot-Power Grinder

An old bicycle wheel, weighted with a lead pipe around its rim, was used to provide a flywheel for the bench grinder shown in the sketch. The ratchet part of a coaster-brake bicycle hub was used for the axle and ratchet device. The axle was mounted in the brace at the end of the workbench, and the support for the grinder was set on the bench in line with the flywheel. A rope was used as a belt and runs in the grooved rim of the wheel. Holes were cut in the top of the bench to permit the rope belt to pass through. The ratchet device was arranged between the flywheel and the brace on the bench, a block being set against the brace to bring the ratchet out sufficiently to make room for the treadle. The latter was pivoted in the rear leg of the bench, and a section of bicycle chain fixed to it as shown, to act with the ratchet. A coil spring, like those used on doors, was fastened to the end of the drive chain and to the end of the treadle. The high gearing of the belt from the large drive pulley



Parts of a Coaster Brake from a Bicycle were Used to Make This High-Speed Grinder, Fitted to the End of the Workbench

to the small one on the grinder gives great speed, which is desirable in a small grinder of this type.—N. Michels, Chicago, Ill.



This Portable Hog House may be Constructed Readily in the Farm Workshop and Provides a Clean, Well-Ventilated Shelter

An Individual Hog House

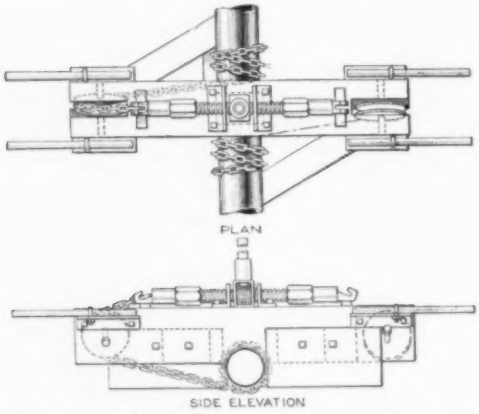
Farmers will find the individual hog house shown in the sketch practical, since it is easy to build, and can be moved from place to place readily on the skids provided. The frame is built up of 2 by 4-in. stuff, braced with ⅞-in. strips. Three A-frames give the main support to the house, and the cross braces are notched into them. It is 8 ft. long and 6 ft. wide, with a door at one end, and ventilating doors on the sides and the other end. The frame is covered with siding, shiplap, or plain ⅞-in. boards. The floor is of heavy planks. The construction provides for ventilation spaces at the gables of the ends, as shown in the lower detail sketch. The side doors are hinged at the top and can be raised and set under props fastened to the ends of the house, permitting the air and sunlight to enter freely, and making it convenient to clean. Fenders should be built around the inside, about 8 in. above the floor, to protect the young shoats.—W. E. Frudden, Charles City, Iowa.

Drawing the Temper in Small Taps and Reamers

The proper way to hold a tap or reamer in drawing the temper is with the threaded, or fluted, end in a round pair of tongs, the squared end to the flame. Draw the tool to the proper degree at the point. When drawn to the proper color, quench it in oil or lukewarm water. This gives the cutting part of the tool the hardness necessary for standing up under the cut, and the shank the strength and toughness necessary to prevent breaking. For tapping cast iron, draw to a light straw, and for steel, to a light brown.

Powerful Wrench Used in Dismantling Large Pipe Line

In removing a line of about 4,000 ft. of 6-in. and 8-in. pipe with screwed joints which had been in place for about five years, the pipe wrench shown in the illustration was rigged from a steamboat jack and a 12 by 12-in. timber, 6 ft. long. With this rig it was possible for one man to start the joints on 8-in. pipe. The device offers suggestion for use in joining or disassembling other large and small-pipe structures.



This Rigging Is Useful in Taking Down Pipe Structures and may be Adapted for Assembling Pipe

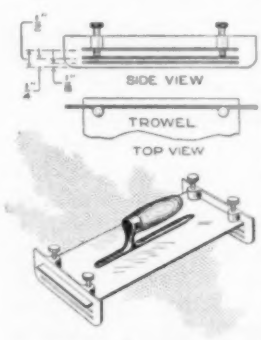
In operation, the wrench was placed astride the pipe, and centered over the coupling. Then the chains were given several turns around the pipe and over the sheaves at the ends, and hooked into the special hooks on the ends of the jack. The screw was given a few turns' hold in each sleeve at the start. Then, by means of the handle and ratchet, the chain was quickly tightened up and the joint broken, in most cases with a jump. The sleeves are kept from turning over by the short bars on the bottom of the hooks. The short diagonal pieces on each side rest against the pipe and take the pull of the chains. The handle used was about 3 ft. long. Two short pipe handles at each end provide means for carrying the device from place to place. For clearness, the chain is shown on one-half of the sketch only, the other half being the same. This rig could also be used for tightening joints in pipe laying by reversing the chains and the diagonal pieces or braces.—E. C. Entler and James Ryan, Keokuk, Ia.

Solid-Tire Rubber for Making Heels

When the rubber-block tires on the motor trucks of a large company are renewed, the old tires are returned to the garage with the vehicle fitted. The workmen trim the rubber blocks to ⅞ in. thickness on the band saw, cut them to the shape of rubber heels, and nail them to their shoes. These inexpensive heels afford much comfort, and are an aid to safety in that they give a more secure footing, and withstand heavy wear.—Theodore J. Becker, Kansas City, Mo.

Gauge for Plastering Trowel

Plaster, stucco, cement, and similar finishes applied in layers of uniform thickness, can be applied quickly and easily with a trowel fitted with gauges like the homemade ones shown in the sketch. They are of 1/16-in. sheet iron, and provided with slots to fit the ends of the trowel, so as to make the layer of plaster ⅛, ¼, or ½ in. thick, as desired. The gauges are fastened with knurled screws. After the roughing application is made, the surface of the plaster must be smoothed with a plain trowel to remove the tracks of the gauges.—Alfred J. Miller, Albuquerque, N. M.

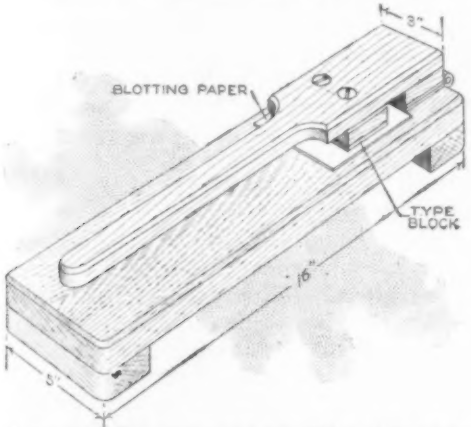


¶Scissor blades may be kept at the proper tension by placing a small flat spring under the head of the screw which holds the parts together.

Title Stamp for the Drafting Room

Every draftsman well knows the tediousness of lettering in the drawing titles by hand. There is, also, an unavoidable lack of uniformity, when there are several draftsmen employed. A standard title, applied to the drawings by means of a hand stamp, shown in the sketch, and permitting of filling in to suit the particular job, overcomes these difficulties in a practical and efficient manner. The drawing for the title should be made three times the size of the zinc etching, which is to be made from it, and used in the stamp. Ordinary printing ink is used on the cut.

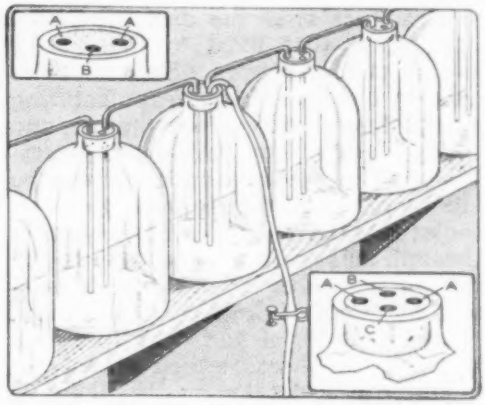
A suitable base for the stamp is made of a piece of wood, 5 in. wide and 16 in. long. The lever, to hold the cut or type block, is 3 in. wide and 16 in. long, one end being hinged to the base. The type block is fastened to the lever with screws, as shown, and a piece of blotting paper is placed under the drawing when an impression is to be made. Ink is kept in a tube, and a small quantity spread on a piece of plate glass, from which it is worked onto the roller, and applied to the type block. The stamp applied to tracings will reproduce white on blueprints, and will be clean-cut, in distinction to the blurred appearance of titles printed with a rubber stamp.—E. E. Stevenson, Los Angeles, Calif.



A Standard Type Block for the Titles of Drawings is Mounted in the Stamp for Convenient Application to Tracings

Handy Containers for Distilled Water

Having use at times for a large quantity of distilled water and not wishing to go to the expense of purchasing the amount of block tin necessary to line a tank sufficiently large, I hit on the following scheme: I had a number of 5-gal. bottles—the spring-water kind—and I fitted each of these with a three-hole cork; two of the holes, A, receive glass tubing, and the third, B, is plugged loosely with cotton, in order to allow the entrance of air and at the same time keep out dust. Each piece of glass tubing was bent in two right angles, and was of such a length that it reached to the bottom of each bottle and allowed the bottles to stand close together. When the first bottle was partly filled with distilled water, from a still, it was easy to run some into the second bottle by siphoning through the glass tube. Later on the water was conducted into the other bottles in order. They were placed on a shelf, and a glass tube, with rubber tubing and a pinchcock, conducted the water as needed from a fourth hole, C. This is an inexpensive means of providing storage for a large supply of water.—William G. Kennedy, Albany, New York.



Distilled Water was Kept in Large Bottles Provided with a Siphon Tube

---

Care in the handling of lathe centers will save regrinding them and prevent inaccuracies from damaged points

Spring Stripping Attachment for Power Presses

By GEORGE P. BREITSCHMID

A FORM of stripper widely used on power punch presses, to remove the product after the dies have been applied, is that fixed to the die by means of four screws. Such a device was in use in a large manufacturing establishment using many presses, and proved costly from various considerations: The device was dangerous to the workman; caused great wear on tools; required that dies be frequently dressed, and made it impossible to see the work in process as readily as is desirable. Cost of production was high, and the profit of the operators was relatively low because their production quantity was kept down. By the introduction of the simple spring stripping device shown in the illustrations, together with jigs for the economical production of its many variations, a striking improvement was made in all of these points. The stripper consists of a flat steel plate, cut to provide clearance for the punch, and is shown fixed to the ram of the press in Fig. 1. The stripper, shown at A, has an opening at its center for a punch of oblong face, a slight clearance being provided all around its edge. The stock of the punch is fixed in the central opening of the ram B, and is clamped by means of the screws. A jig for boring and counterboring the stripper, for fastening it to the ram, is shown in Fig. 2; three views of a jig for marking the center opening with clearance for the punch are shown in Fig. 3, together with details of the adjustable handle.

The ram of the press B was first bored for two heavy screws, C, and counterbored at the top and bottom, the heads S of the screws being countersunk at the top and chambers provided at the bottom for $\frac{5}{16}$-in. square helical springs, D, of tool steel, $1\frac{1}{16}$-in. pitch, tempered. The latter are compressed between the collars E and the upper surface of their chambers, by the pressure of the ram in operation. They are adjusted by means of a steel rod, inserted in the cross-bored sockets. The action of the springs upon the stripper, which is fixed to the lower ends of the large screws by means of smaller ones, is to thrust the punched work from the punch. The stripper is made of $\frac{3}{8}$-in. machine steel; the length is standard, 8 in., as shown in Fig. 1, and the holes in it are bored 6 in. apart on centers. The width may be suited to the dies.

The jig for boring and counterboring the strippers accurately and uniformly, so that they may be used interchangeably on various presses, is shown in Fig. 2. It consists of a metal base, F, to which are fitted clamps, G, held in place by screws. The clamps are adjustable at the slots in them, and the blank from which the stripper is to be made is fitted under the clamps, the ends of the blank being set against two stops, H. Hardened steel bushings, J, are fitted into the base as guides for the boring of the stripper. The smaller holes are bored on 6-in. centers, with the base inverted. The counterboring is done with the base in the position shown. The stripper is indicated by the dotted outline.

The jig for marking the opening in the stripper, through which the punch passes, and for allowing the necessary clearance of $\frac{1}{16}$ in. all around the punch, is shown in Fig. 3, in top, front, and side views.

The device consists of a base, K, carrying a vertical post, L, dovetailed to a vertical sliding member, M. The latter can be adjusted vertically and tightened in position by the threaded rod N, which is held firmly by the spring plate O. The plate is shown in detail at the upper part of Fig. 3.

In operation, the stripper, drilled by the use of the jig shown in Fig. 2, is fitted over the pins P, which fit snugly into the holes in the stripper. The sliding gauge Q is moved to hold the edge of the stripper, the jaw R being undercut to hold the stripper down as

well as from the side. The punch S, inserted into its holder, or a split bushing if the punch has a small shank, is now be fastened into place on the ram of the press, as shown in Fig. 1.

The stripper is made of varying

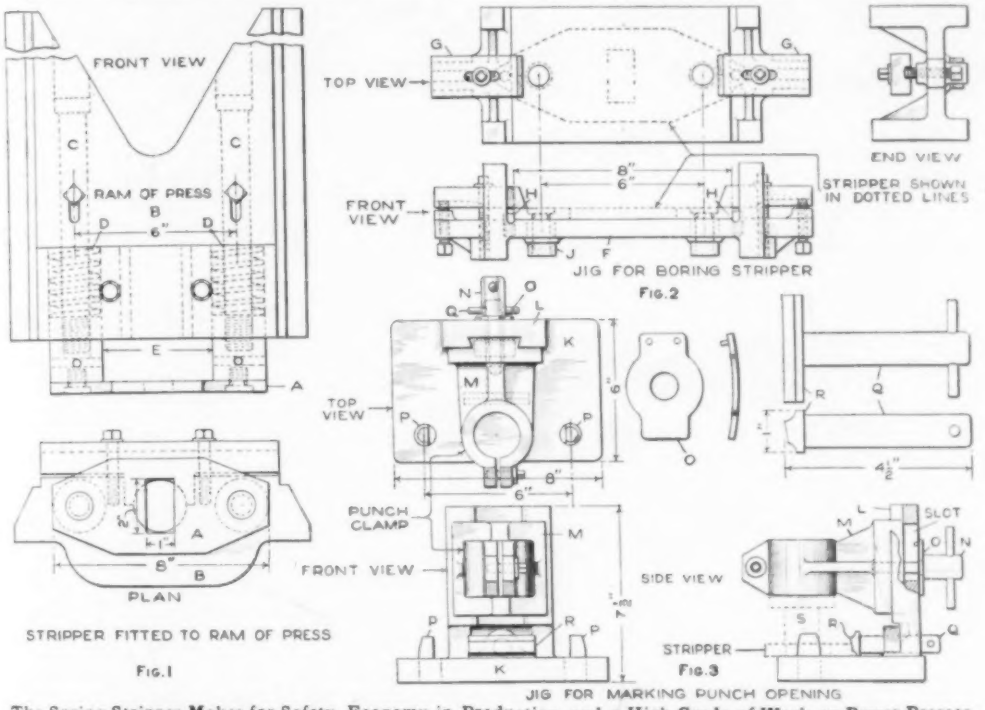


FIG. 1 FIG. 2 FIG. 3

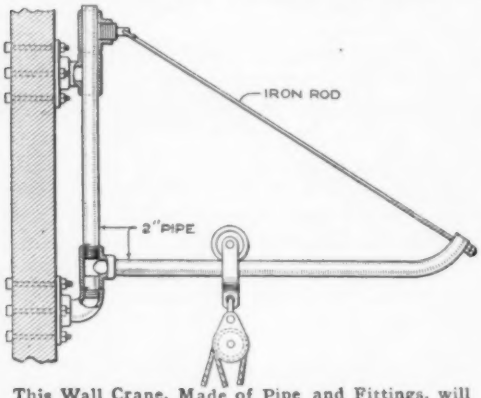
The Spring Stripper Makes for Safety, Economy in Production, and a High Grade of Work on Power Presses. Fig. 1 Shows the Stripper Fixed to the Ram of the Press. A Jig for Boring the Fastening Holes in the Stripper is Shown in Fig. 2, and a Jig for Marking the Clearance Hole for the Punch is Shown in Fig. 3, with Details of Parts

placed in the clamp of the sliding member M. It is lowered to rest upon the stripper blank, and, with a scriber, a line is scratched around the punch on the surface of the stripper. Clearance of 1/16 in. all around is allowed, and the clearance hole is drilled out and filed smooth. The stripper may widths to accommodate it to different jobs, but since the fastening holes and the length are standard, the jigs may be used for a large variety of work. The stripping attachment may be fitted to various types of punch presses, and is suitable for blanking, perforating, or bending operations.

Wall Crane for Small Shop or Garage

In garages and machine shops where it is necessary to handle heavy machine parts, a small crane saves much time and effort. The illustration shows a wall crane, built largely of 2-in. pipe and fittings, that can be made readily, and has a wide range of use if properly located on the shop wall. The dimensions may be varied to suit special conditions, and a length of about 10 ft. for the arms is satisfactory. This size will lift objects weighing up to 1,000 lb. with safety. The arms of the bracket are fitted at their upper and lower ends into tees, to form a right angle, and to give a fastening at the top for the brace, which is an iron rod. It is fixed at its upper end to a plug screwed into the tee, and at its lower by bolting it to the turned-up end of the horizontal member. The vertical support is carried at its lower end in an elbow, and near its upper end in a tee, fitted into

a flange and bolted to the wall. A suitable trolley and tackle may be pro-

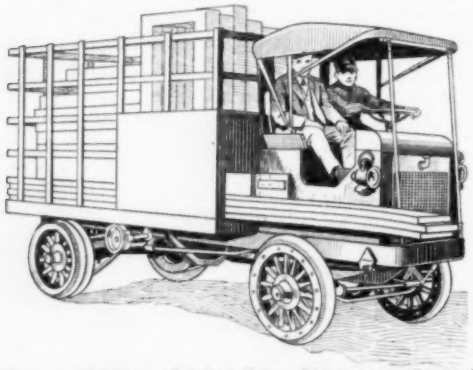


This Wall Crane, Made of Pipe and Fittings, will Carry a Load Up to 1,000 Pounds, if Carefully Made

vided either by making the pulleys and fittings or purchasing them.—Thomas W. Benson, Philadelphia, Pa.

Truck Arranged for Hauling Long Stock or Ladders

Under traffic laws in various localities, vehicles are not permitted to carry long articles that extend over 5 ft. at the rear, without hanging on a danger signal. To overcome this, and for convenience in handling long beams, lumber, etc., a transportation company fitted its trucks with doors in the front end, permitting long pieces to be passed through and extend along the radiator, as shown in the illustration. This helps



Beams, Planks, and Other Long Objects are Carried Conveniently by Reason of the Door

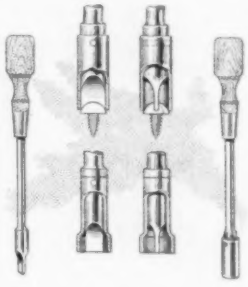
to balance the load and prevents it from dragging along the road.—J. C. Grindell, St. Louis, Mo.

Repairing Ratchet on Steering Post

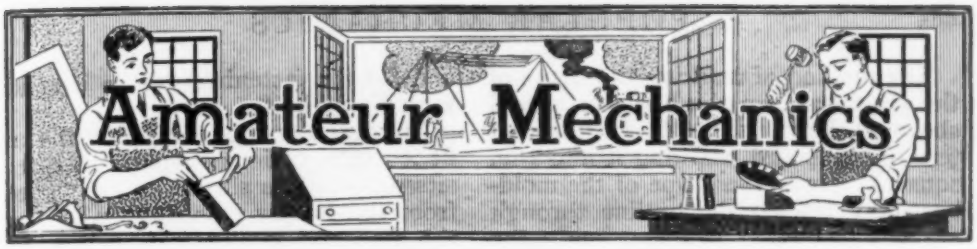
On account of the severe wear on the steering-post ratchet of a "jitney" driver's automobile, he was forced to devise a method of using the worn ratchet in an emergency. He wound a heavy brass wire around it, the wire resting in each of the cogs. The follower engaged the wire just as it had the ratchet teeth, and the repair was so satisfactory that it was unnecessary to replace the part.

Cap for Screwdriver Reduces Marring of Work

The slipping of a screwdriver from the slot of a screw being fastened into a finished surface usually results in a severe injury to the finish. This condition was met in automobile work in putting screws into highly finished surfaces on bodies and other fittings. The screwdriver, shown in the illustration in several forms, was devised for the purpose of overcoming this, and proved quite satisfactory. The lower end of the screwdriver, in the simplest form, was ground as shown at the left, and a sleeve fitted over it, as shown above. The sleeve was made fixed for certain kinds of work, and movable on a pin and spring for work requiring this adjustable feature. The screw is driven in the usual manner. For larger screws, the sleeve was enlarged at its lower end, as indicated in the lower sketches. The device is useful also in driving screws in rough work, enabling the workman to work quickly with less danger of the driver slipping from the slot.—Charles C. Brabant, Detroit, Mich.



¶Draw enameled wire between a folded piece of sandpaper to remove the insulation.



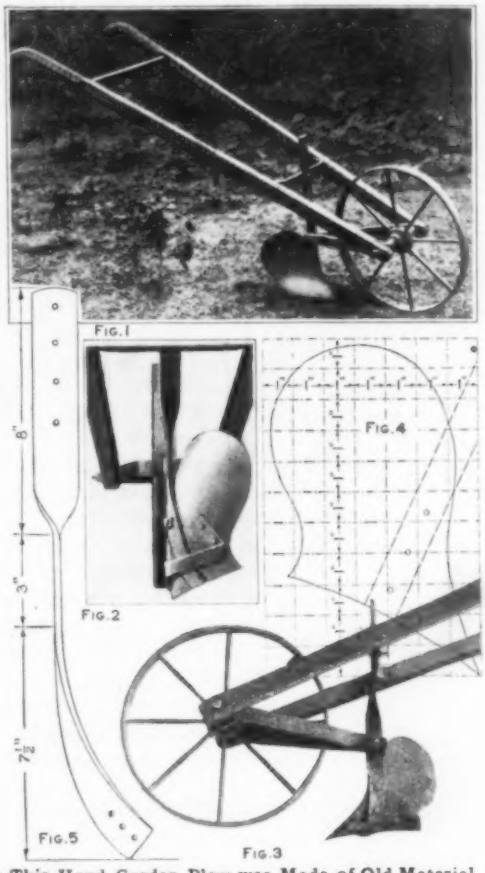
Garden Plow Made of Pick-Up Material

By T. T. STURGEON

THE labor of spading a garden of even moderate size is sufficient to warrant the person who undertakes the job in making a hand plow like that shown in the illustration, for it will serve many years, with reasonable care. I made one worth about $5 at an outlay of 25 cents, gathering the necessary wood and metal from among old machine parts and pick-up material.

An old wheelbarrow provided the 16-in. wheel. The handles were made from a ⅞ by 4-in. strip of spruce, 5 ft. long. They were marked on the strip so that one of the curved grips was at each end, on opposite edges. The curved parts of the grips were cut with a keyhole saw, and when a kerf long enough to admit a large ripsaw was cut, the board was ripped into the two handles. They were smoothed and the grips trimmed with a sharp knife. A section of broomstick was cut for the upper brace. The lower one is made of a strip of iron, ¼ by 1¼ by 12 in., drilled for ¼-in. bolts, and bent at right angles, 1½ in. from each end. Drill a ¼-in. hole at the middle, to engage a bolt on which the vertical strip is supported, and adjusted to the operator, as shown in Fig. 1.

Cut a strip, ¼ by 1¼ by 18 in., for the vertical support, shown in Fig. 5. Drill four ¼-in. adjusting holes, 1 in. apart, at the upper end, and three ¼-in. holes at the lower end for fastening the strip to the moldboard, as shown in Fig. 3. Drill a 5/16-in. hole at the 7½-in. mark, for bolting the strip to the braces, the other ends of which are fitted on the ⅜ by 10-in. bolt used as an axle. Cut the two braces 14 in. long, of ¼ by 1¼-in. strips, and drill a ⅜-in. hole in the forward end of each, to fit the axle, and a 5/16-in. hole in the opposite ends, 1 in. from the ends in each case. Cut



This Hand Garden Plow was Made of Old Material, a Shovel being Used for the Making of the Moldboard

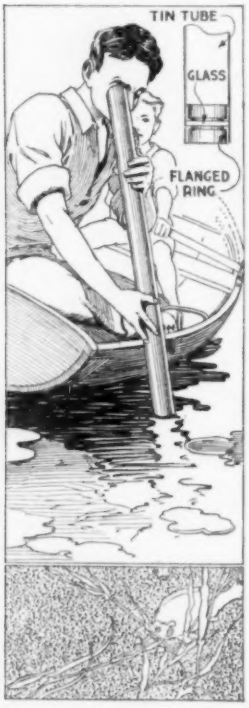
a strip, ⅛ by ¾ by 12 in., for the landside, as shown in Fig. 2, bent under the moldboard, and bolted to it. The proper angle can best be bent after the moldboard is made and fitted.

The method of marking the shape of the moldboard on the blade of an old shovel is shown in Fig. 4. Make a pattern of cardboard, marking it into 1-in. squares. Draw the shape of the moldboard by tracing the outline through the corresponding squares, using the diagram as a guide. Mark the position of the bolt holes, for fastening it to the vertical support, indicated by the dash lines at the right. Cut out the pattern and trace around it on the shovel, using the thickest part for the point of the share. Cut out the outline, smooth the edges, and point up the cutting edge. Drill holes for fastening the moldboard to the vertical strap with ¼-in. bolts, and for the fastenings to the landside, with 3/16-in. bolts.

Curve the moldboard into shape and fit it to the various supports so that it sits properly, as shown in Fig. 1, seen from the furrow side, in Fig. 2, from the rear, and in Fig. 3, from the land side. Bend the 12-in. strip into shape, as shown in Fig. 2, and bolt it into place, to form the landside. Assemble the parts, being careful that the wheel and landside are set in line, as shown in Fig. 2, and that the rear edge of the latter is raised slightly, as in Fig. 3. The plow should be given a coat of paint, and the cutting parts made smooth, and oiled.

An Interesting Water Telescope

A water telescope is easy to make and will afford much pleasure in exploring plant or animal life in comparatively shallow water. The device is made by fitting a heavy glass disk into the end of a round metal tube, about 2 in. in diameter. The glass is fitted between two rings of metal, preferably with a small flange set against the glass. A waterproof cement is used to fix the glass between the rings. To use the "telescope," rest it on the side of a boat or other convenient place at the water, and set the lower end, containing the glass, under the water. Remarkably clear views may be had in this way.—S. Leonard Bastin, Bournemouth, England.



Writing on a Moving Train

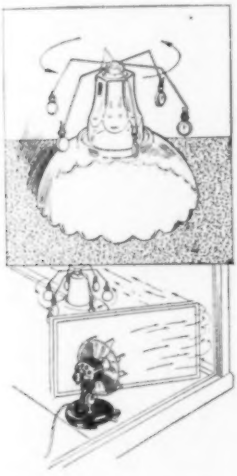
Writing legibly on a fast-moving train is difficult to a person unaccustomed to it. The railroad conductor knows the trick of it and manages to get along quite satisfactorily. He prefers to write in a standing position and holds his right elbow firmly against his side. The reason for this is that in a sitting posture there is too much lateral movement in the trunk of the body, while in a standing position this is more easily controlled. When the arm swings freely, as in ordinary writing, several joints of the body are affected in the process, each of which is capable of its own motion. Holding the elbow against one's ribs "breaks" these motion tendencies, except that of the wrist, which movement is necessary in writing, and thus the pencil, or pen, is more easily controlled.

The same principles modified apply in using a typewriter on a moving train. Many traveling men, news correspondents, and others, carry portable typewriters and do much of their writing while traveling on trains, not to mention the various railroad and government men who travel in office cars and necessarily must get out their correspondence en route. It is extremely difficult to execute neat typewriting on a moving train with free-arm movement, even though the central portion

of the car where the vibration and swing is less severe, is selected. As I am employed in such capacity, I had to evolve some plan to expedite the work. I am able to do typewriting quite rapidly by resting the palm of the hands, near the wrists, against the front edge of the typewriter frame surrounding the keyboard, and using the swing of the fingers instead of that of the whole arm, as in ordinary typewriting.—Victor Labadie, Dallas, Tex.

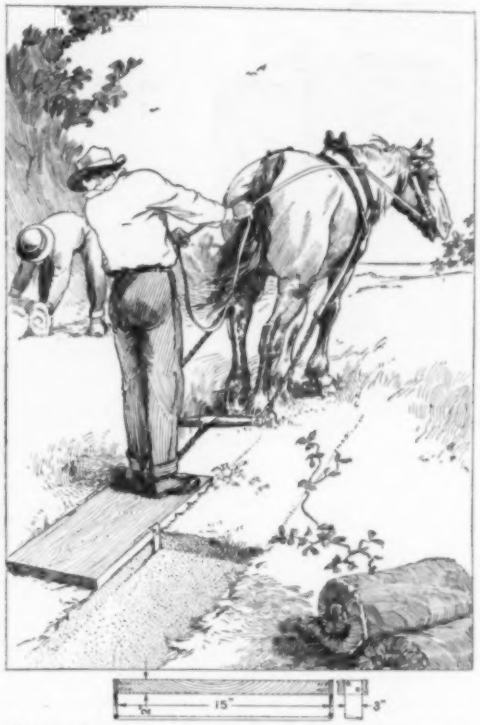
A Revolving Window Display

A jeweler attracted passers-by and not a few customers by placing a revolving display in his window, which was kept in motion by means of the arrangement shown in the sketch. A 10-in. cut-glass bowl was placed, upside down, near the front of the show window. An inverted tumbler was set upon it and a small tin box was pivoted on the tumbler by means of a needle soldered inside of it. Six arms of wire were soldered to the box, and watches were suspended from them. The carefully balanced frame revolved easily on the point of the needle. It was kept in motion by the draft from a fan hidden behind a mirror.—H. S. Hart, Shreveport, La.



A Horse-Drawn Sod Cutter

The cutting of a considerable area of sod is tedious work when done by hand, and it is difficult to make the sections of uniform thickness and size. These important features are provided for by the use of the homemade sod cutter shown in the sketch. To start a cut across a meadow or lot, a notch is cut in the turf for the blade, and the device is set into place, stamping it down to give a good start. The operator stands



With This Device Sod may be Cut Quickly and of Uniform Width and Thickness

on the plank in front of the blade, and a little practice will soon determine the best position for ease in operation. When a cut has been completed, the cutter is dragged to a fresh starting place, the driver turning it over on the upper side. The strips are cut into suitable lengths and piled conveniently for removal with a stone boat or wagon.

The device may be made of any suitable width; 15 in. between the inner edges of the blade, and the latter set to cut a depth of about 2½ in., being desirable. The board is a 2-in. plank, about 4 ft. long. The blade should be set with the cutting edge slanting slightly downward so as to make the device "bite" into the ground. A smaller cutter may be made for use by boys, several of whom may draw it.—F. H. Sweet, Waynesboro, Va.

Homemade Talking-Machine Cabinet

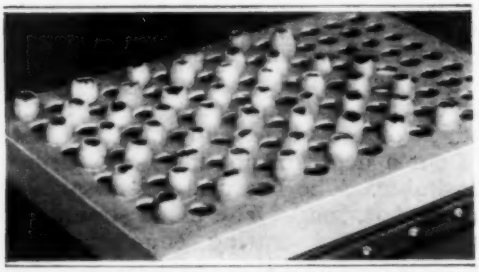
An old six-foot folding screen, three-ply ¼-in. panels from a packing box, and parts from secondhand talking machines, were used to make the cabinet shown in the photograph reproduced. The screen was cut down to form a framework of the desired height for the sides and back. Other parts of the screen were used for the frames of the doors on the front, and for the top. The panels were made from a good quality of three-ply stock, with a hardwood face, which was scraped, sandpapered, and brought to a very smooth finish. The material happened to have a pretty grain, and this added to the effect when it was stained and varnished. Pieces of this stock were used for the sounding horn and for other interior fittings, such as the shelves for records and the drawer below the horn. Space is provided for a large supply of records.

This Cabinet was Made by an Amateur Woodworker at a Cost of $16.35 for Materials

A secondhand two-spring motor, a turntable, and a sound arm from a disk machine were fitted into the cabinet, and gave excellent service. Care in staining the woodwork, shellacking, and varnishing it with several coats, gave the cabinet almost a commercial finish, and at a cost of $16.35 for all materials.

Eggshells as Flowerpots

A novel method of caring for small plants until they are ready to be set out in the garden is shown in the photograph reproduced. Holes were bored in the bottom of the till of an old trunk and eggshells fitted into them. Seeds were planted in the shells and the names of the varieties were marked on them. The arrangement is compact, and when the plants are ready for planting, the shells may be broken, and the plants set without disturbing the roots.—Charles Darlington, Des Moines, Ia.



Seeds were Planted in the Eggshells, Which were Broken without Disturbing the Roots When Transplanted

---

A Recording Annunciator Target

In rifle practice it is often desirable to provide a target which will indicate to the marksman when the bull's-eye is struck. The device shown in the sketch, arranged behind an ordinary card target, has given satisfactory results on a private range, and can easily be adapted for other uses.

Referring to Fig. 1, A indicates a wooden base, 4 by 8 by ½ in., on which is mounted a strap hinge, B, 6½ in. long, by means of a block, 1⅜ in. high. An opening, C, 1½ in. in diameter, is provided in the base, and a plate, D,

1¾ in. square, is riveted to the strap hinge opposite to the opening. An electromagnet, E, obtained from an electric bell, is mounted upon the base under the small end of the hinge. A standard, F, provided with a cross arm, G, is secured upon the base between the opening and the magnet. A thumbscrew with a locknut extends through the cross arm, engaging the rear side of the strap hinge, and permits an adjustment of distance between the core of the magnet and the surface of the hinge. A bell or buzzer, H, is connected as indicated, through the battery circuit. The electromagnet is connected through the battery and push button J.

The strap hinge normally rests against the electromagnet. The force of any projectile passing through the opening against the plate closes the bell circuit and indicates to the marksman that the bull's-eye has been hit. By the closing of the magnet circuit, the strap hinge is drawn again into normal position and the bell circuit is broken. Figure 2 shows a front view of the circuit-closing device. The device may be mounted in any suitable box, as suggested in Fig. 3. The front

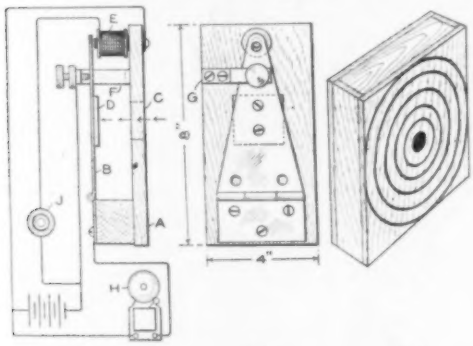


Fig. 1 Fig. 2 Fig. 3

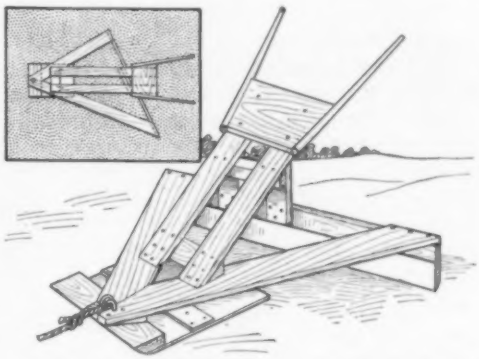
The Bullet Forces the Hinge against the Thumbscrew, Causing the Bell to Ring

of the box is covered with sheet metal, 1/16 in. thick, and the standard target card is mounted thereon.—John B. Brady, Washington, D. C.

¶A convenient method of holding paper in a roll is to fasten a wire clip at each end near the edge of the piece.

Scraper for Tennis Court

In order to level and scrape a tennis court, which was in bad condition, the two-man scraper shown in the sketch



A Tennis Court was Smoothed and Leveled by the Use of This Scraper, Made Quickly of Rough Lumber

was made. It is built of rough lumber, and a metal shoe is fixed to the lower edge of the scraping blade at the rear. The bearing at the front is on a flat-bottom sled of wood, and the depth of the cut is regulated by pressure on the handle. The scraping blade is set at an angle, as shown in the smaller sketch. By lifting the handle slightly, the operator is able to deposit dirt in holes so that when the court is rolled they are filled evenly. Where a large number of courts are to be smoothed, the device may be adapted and made large enough to be drawn by a horse.—Edward R. Smith, Walla Walla, Wash.

Barrel Staves as Springs for Play Auto

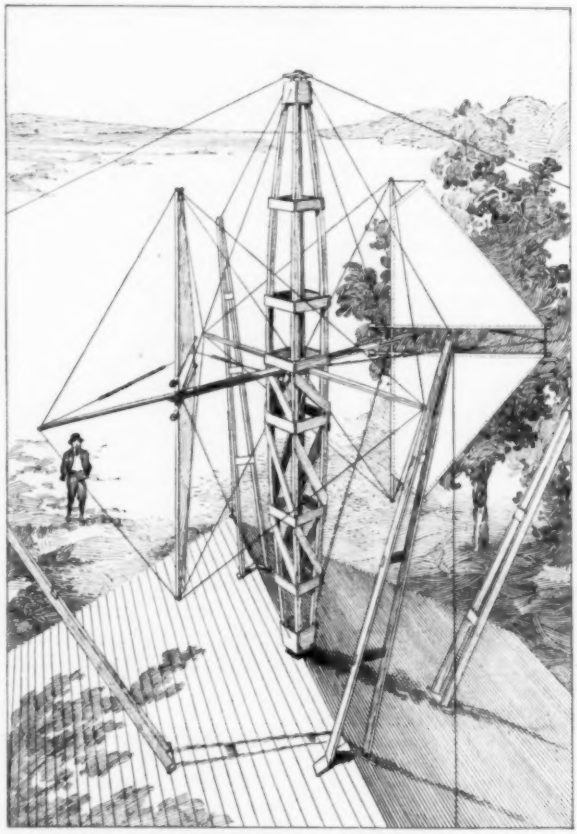
I made springs for a small foot-power automobile by using barrel staves joined together in the shape of pointed oval wagon springs. Two strong staves were nailed together at each end and braced with a block where they were nailed. Two of these springs were placed over the rear axle and one of them was set over the front axle extending in the direction of its length. The wooden springs made the automobile ride comfortably.—Charles Delbridge, St. Louis, Mo.

A Sail-Rigged Wind Motor

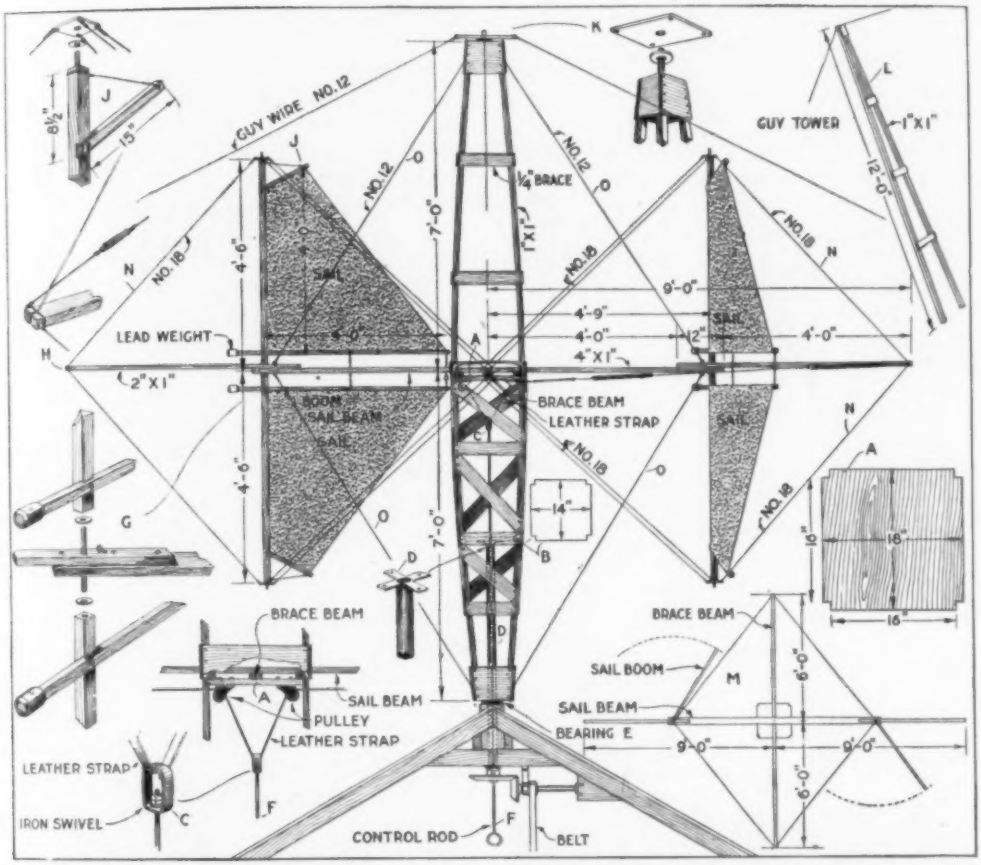
By E. R. HENDERSON

AMPLE power for driving light machines in a repair shop was obtained by the use of a wind motor like that shown in the sketch and in the detail drawings. The device has numerous other applications, particularly as a substitute for wind motors that require a high tower, as in the driving of a pump. As an interesting and inexpensive means of providing power for a home or boy's workshop, or as an experimental device, the motor is also worth while making. The materials used are easily obtainable, and the construction can be carried out with ordinary tools, for the most part. The driving connections may be obtained from old machine parts. The dimensions given are for a motor of considerable size, and may, of course, be reduced proportionately for a lighter machine. If the device is made by boys, the framework and other parts should be made one-half as large as the sizes indicated. The wood used should then be three-fourths as thick as that shown. The roof of the structure upon which the device is mounted must be well braced and strong enough to stand the strain. The sails are headed toward the wind, like those on a sailboat, when the motor is at rest, by means of a control rod, F, shown in the working drawing.

The main structural portion is a vertical beam, or tower, tapered at the ends and built up of 1 by 1-in. rods, strongly braced, especially in the lower portion, as indicated. It is 14 ft. high, and built around an 18-in. square board, A, notched at the corners to receive the posts. A similar 14-in. square, B, is built into the lower portion. The lower end of the tower is pivoted on the ridge of the roof on a hollow shaft made from a section of iron pipe, D, and provided with a metal bearing washer, E. The pipe D is split at its upper end, as shown in detail, and fastened to the wooden plate B. The control rod F passes up through the pipe D, and is fixed to the control wires, reaching the sails, by means of a leather strap, from which an iron swivel, C, is suspended, as shown in the detail at the left. The ends of the strap pass over pulleys, fixed to the lower side of the plate A, and connect with the sail-control wires. Spiral wire springs are attached to the wire connected to each end of the strap, as shown only at the right sail beam, and aid in controlling



This Novel Wind Motor Developed Power for the Driving of Machines in a Repair Shop, and can be Made in Various Sizes for Work or Play Purposes



The Method of Construction is Shown in Detail: By Using the Perspective Sketch in Connection with These Working Drawings, the Arrangement of the Parts is Readily Understood

the sails. These springs are adjusted so that when the control rod is drawn down to its lowest extent, the sails will be with the edge "into the wind," thus neutralizing each other, and causing the sail beam to be at rest.

The sail beam extends 9 ft. out from the center of the tower, and is built up of three pieces. The center section extends through the tower, above the plate A, and the brace beam, which crosses it at right angles, as shown in the perspective sketch and also at the detail of the strap arrangement. The center section is of 1 by 4-in. stock, and the end portions are of 1 by 2-in. stuff, fastened securely, as shown at detail G. The sails are supported on masts, 1 in. square, pivoted at their junctions with the sail beam, as shown at detail G, and in guy-wire plates at their extreme ends, as shown at detail J. The fastening and bracing of the gaffs at the mast ends is also shown at J.

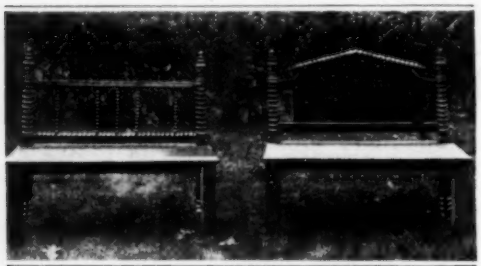
The canvas sails are 4 by 4 ft., and mounted on the booms, gaffs, and masts. The ends of the booms nearest the masts are weighted with lead, as shown at detail G, and extend beyond the masts. The outer ends of the booms are joined in pairs, and connect to the spring and strap control. The guy wires N, of No. 18 wire, supporting the masts are fixed to the ends of the sail beam and to the ends of the brace beam, as shown in the sketch and the working drawing. The fastening at the ends of the sail beam is made as shown at detail H, which also shows

one of the coil springs. All of the braces for the masts should be fitted carefully, so as to have the proper tension without interfering with the action of the sails, before the tower is set into its place. The device should be tested on the ground, with the pivot shaft set in a suitable support, before attempting to mount it on a roof, or other structure. The support for the bearing should be fitted into the roof, as shown. The power from the shaft is transmitted to the bevel gears, and from them to the drive shaft and the belted pulley.

The main tower is supported on the roof by means of strong guy wires, set over four built-up guy towers of 1 by 1-in. wood, and 12 ft. long, as shown in detail L. The towers must be set so that the sail beam has proper play, and be secured firmly to the roof. The top of the main tower is fixed to the guy wires by means of a guy plate, shown in detail K. A plan of the arrangement of the sail beam, brace beam, and sail booms is shown at detail M. The sail beam is braced by No. 12 guy wires, O, attached at the top of the main tower, at the junction of the two sections of the beam, and similarly at the bottom of the main tower. The fastenings of the wires and braces should be made carefully, and they should be examined thoroughly both before and after the device is mounted in place. Grease the pivoted and other moving parts, and start the device slowly, bringing the sails into the wind as required for the desired speed.

Lawn Benches Made from Old Bedsteads

Old bedsteads were converted into serviceable lawn, or porch, benches, as shown in the photograph reproduced, by the addition of a suitable seat, properly supported. The transformation was a simple one. Only the foot and headpieces of the bedsteads were used. The front legs and other pieces were made from other wood. The front legs are of square stock, about 2½ by 2½ in. The crosspieces, supporting the wide board seats, are mortised into the legs and fastened with glue and screws. The seat is fastened from the under side by cleats. The lumber was carefully planed and sandpapered so that the benches presented a smooth finish when painted green, to match other outdoor furniture.—F. E. Tuck, Nevada City, Calif.



Painted Green, These Rebuilt Bedsteads Served as Lawn Benches

---

Repairing Wood-Wind Instruments

Wood-wind instruments sometimes "leak" at the joints or keys and make playing of the instrument difficult. Many such instruments are made in sections, with ends that telescope to form a tight fit. This fit is maintained by the use of a cork band cemented around the tenon end of the telescoping joint. The renewal of these cork joints, and the addition of new pads on the keys, will make an old instrument nearly as good as it was when new, so far as playing is concerned, provided the work is correctly done and the wood of the sections themselves has not cracked. Many musicians have spare time and can do this work themselves. The outlay for materials for the job is from 75 cents to $1.00. A small alcohol, or even a kerosene, lamp and an old knife, or old file, are required.

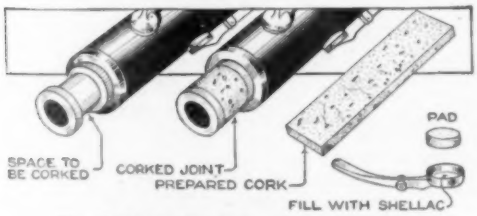
All traces of the old cork on the joint can be removed with sandpaper, leaving it as shown at the left. The cork comes in strips of about the proper thickness, and wide and long enough to allow for trimming. The ends of the

strip should be beveled to make a ¼-in. lap joint.

A small quantity of the cement is heated over the lamp and six drops poured on the joint; then with the end of the file, which should be heated also, it is spread to give an even, thin coating. The beveled ends of the strip are similarly treated. By working quickly and carefully, the coating on the joint and strip are brought to a plastic state by holding in the flame, and the strip is quickly laid in place. Before the cement has time to harden, press the cork in, forming a neat joint. Bind a rag around the cork, leaving it until the cement is thoroughly set.

The corked joint will be too large to go into the joining section of the instrument. File and sandpaper it to a twisting fit. Though the cork should be truly cylindrical, it may be tapered a trifle smaller at the forward end. A coating of tallow applied to the joint will make it easy-fitting, but air-tight and moisture-proof.

The pads are disks of felt incased in thin sheepskin. After long usage, they become too hard to make an air-tight fit. Repadding should, therefore, be anticipated. Shellac will give good results in putting on pads. It is heated until liquid and poured into the key recess. The new pad is pressed into the liquid shellac, care being taken to have it well



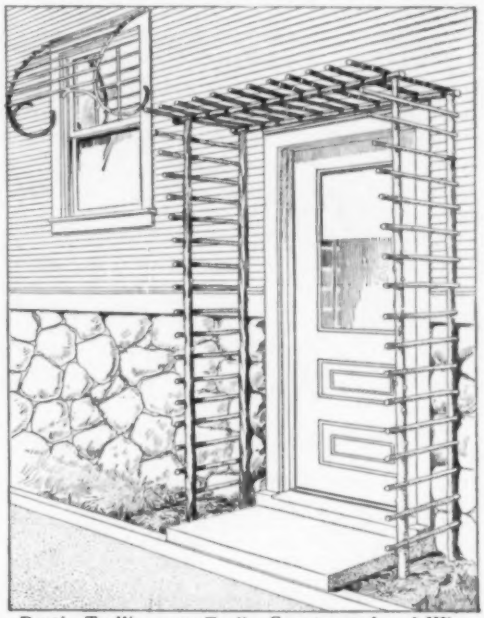
The Cork is Fitted Carefully into Place, and Glued

centered. For different keys, it will be necessary to use varying quantities of shellac to make the pad sit higher or lower, as required.—Donald A. Hampson, Middletown, N. Y.

¶A simple method of bracing a screen door is to stretch a stout wire diagonally across the lower portion of it.

Rustic Trellis to Shade Door or Window

Proper preparation in the early spring will make it possible for the householder to shade doors and win-



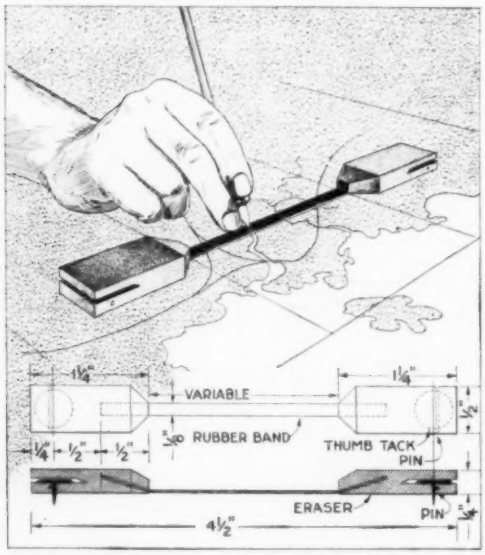
Rustic Trellises are Easily Constructed and When Covered with Vines Add to the Attractiveness of the Home

dows from the hot summer's sun by means of inexpensive rustic trellises that add not a little to the beauty of the home. A suggestion for a trellis at a doorway and one for a window are shown in the illustration. They are made of straight tree trunks and small limbs, having the bark on them. The curved portions of the window trellis may be made easily by using twigs that are somewhat green. Morning-glories, or other suitable climbing plants, may be trained over the trellises.—J. G. Allshouse, Avonmore, Pa.

Making Scale Enlargements with a Rubber Band

For reducing or enlarging maps, and similar drawings of irregular design, the device shown in the illustration will replace the ordinary instruments, and enable the draftsman to turn out a

given amount of work in much less time than required when proportional dividers are used. The materials needed are an eraser, a rubber band,



This Simple Device Is Useful in Enlarging or Reducing Drawings and Maps

two pins, two thumb tacks, and a few drops of rubber cement. From the eraser two pieces are cut, as shown in the sketch, about ¼ by ½ by 1¼ in. Cut deep slits in each end of these pieces. Insert the end of the rubber band, cut at the splice, in one of these slits and place a thumb tack in the other. A pin is thrust through the eraser and trimmed close, to prevent the thumb tack from tearing the eraser. Cement the slits with rubber cement, and place the assembled device under a book weight, until the cement has set.

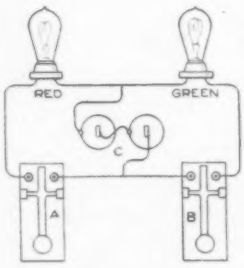
Assuming that a contour map is to be enlarged, the rectangular divisions of the original map, ordinarily section lines or the boundaries of quarter sections, are drawn on the larger sheet as a base for the reproduction. Place the device on the original map, as indicated, the edge of the rubber band touching a "horizontal" section line between two "vertical" ones, the rubber band under slight tension. On the black surface of the band, dot white points, with water color, along the section line at which the contour lines intersect it. Also place a dot at each end of the band to indicate the position of the two "vertical" section lines between which the band is set.

Transfer the device to the same relative position on the enlargement, stretching the rubber band. Make dots at each end, denoting the "vertical" section lines, for the corresponding lines on the enlargement. The series of intermediate points along the band will be in the same relative position on the enlargement as they were on the original. They can be connected on the enlargement with as accurate a result as obtained by the use of proportional dividers, and more rapidly.

After the points are indicated upon the enlargement, the reproducing device is removed and the surface of the rubber band cleaned instantly by touching it with a moist cloth. The exposed part of the rubber band is a variable, and the device can be made with this dimension adapted to the work. It is capable of enlarging or reducing at a ratio not greater than six to one, above which the rubber band approaches its elastic limit.—H. L. Wiley, Seattle, Wash.

Signal Telegraph with Green and Red Lights

By arranging a circuit with batteries, lights, and keys, as shown in the diagram, a signal telegraph may be made that will afford much pleasure to boys and may be used for practical purposes. The keys A and B are wired into the circuit with a battery C and a red and a green incandescent lamp. A simple set of signals may be devised easily so that messages may be sent in the code.—James R. Townsend, Itasca, Texas.



Laying Out a Horizontal Sundial Plate

To make a sundial accurately it is necessary to lay out the lines for the particular locality where it is to be used, as a dial will vary slightly according to the latitude. The parts may be made of wood, metal, or stone. A good method is to have a bronze casting made from a wooden pattern. The lines may be cut with a lathe and planer in a machine shop, or engraved by hand.

The illustrations show how the dial is made. The lines, as indicated in Fig. 1, should be laid out very carefully, first on a pattern. Draw a horizontal line near the top which represents the six-o'clock line, A-VI, in Fig. 2. Then lay out another line AH, at right angles to A-VI. Take a point C at any convenient place and construct the right-angled triangle ABD. The angle CAB should be equal to the degree of

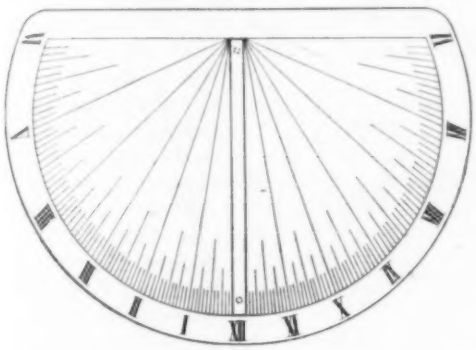
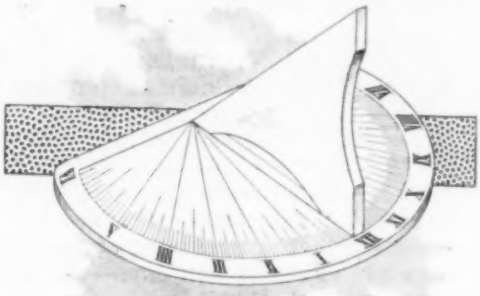


FIG. 1

Lay Out the Dial Plate Symmetrically, Allowing Space for the Style

latitude of the place. The angle CBD equals CAB. Take a compass and set it to a radius equal to the side BD, and draw the quadrant DF from E. From D draw the line DG out for same distance and parallel with A-VI. Now divide the quadrant DF into six equal parts. Draw the lines E1, E2, E3, etc., and where they intersect the line DG, draw the lines from A, as A-I, A-II, A-III, etc. These are the hour lines. Divide each of the six divisions of the quadrant into four parts, and draw the lines, as shown between the 3 and 4 divisions. These are the 15-minute parts. Each of these parts may be divided in turn, and this is best done by eye, unless the dial is quite large.

This will complete one-half of the



The Dial is Mounted Horizontally with the High End of the Style toward the North

dial. The other half is done in the same manner, leaving a space between the line AH and its corresponding line for the other side of the dial. This space should be equal to the thickness of the upright shadow-casting piece, or style. The style has its base equal in length to the line AH, and its angle, S, equal to the latitude, or the angle CAB. It is mounted in the space with the high end at 12 o'clock. It may be fastened to the dial with screws passing through the base. Mount the dial horizontally on a suitable pedestal. The style should be exactly north and south, with 12 o'clock toward the north. The dial will be fast or slow over clock time. This is corrected by consulting

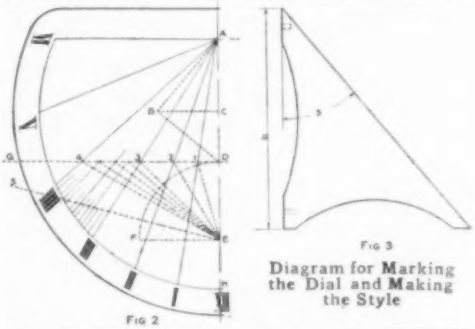


FIG. 2

FIG 3

Diagram for Marking the Dial and Making the Style

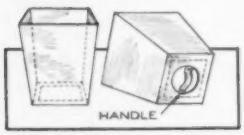
an almanac and setting the clock accordingly from the dial. A correction plate may thus be made and mounted on the pedestal.—F. B. Walters, Baltimore, Md.

Wire-Mesh Support for Flower Centerpiece

Pansies, violets, or other short-stemmed flowers cannot easily be shown to advantage in a table centerpiece unless properly supported. By placing a frame of wire mesh in the dish, as shown in the sketch, the stems of the flowers may be set in the openings, giving a neat and effective display.—Victor Carpenter, South Bend, Ind.

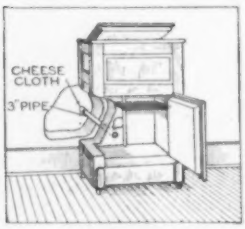
False Bottom for Emptying Wastebasket

In order to avoid handling paper and other material which sometimes sticks in a wastebasket, I arranged a false bottom in the receptacle, as shown in the sketch. A hole was cut in the bottom of the basket and a square board, nearly as large as the bottom, was fitted over it, and a leather handle provided. The basket may be emptied quickly by forcing out the false bottom, without the hands touching the contents.—Harold Laughlin, Reading, Michigan.



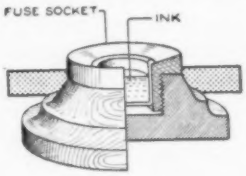
Making Use of Refrigerator in Winter

By fitting a 3-in. pipe into the lower part of a refrigerator so that a draft of cool air from outdoors is available in cold weather, it may be used without ice for a considerable part of the year. The top is left open slightly, and a piece of cheesecloth is tied over the outside end of the pipe, to prevent dust from entering. A tin shutter is placed on the inside of the refrigerator to close the pipe in extremely cold weather. This arrangement has proved quite satisfactory for the winter storage of food.—R. R. Dowsley, Prescott, Canada.



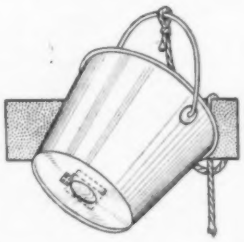
Inkwell Base Made from Fuse Socket

Workers in the munitions industry frequently devise small useful or ornamental objects in imitation of, or from, discarded parts on which they work. The inkwell shown in the sketch was made from a rejected fuse socket of a shrapnel shell. It was fitted with a glass container and fastened into a wooden base.



Valve-Bottom Pail for Dipping Water

An ordinary pail may be converted into a convenient device for dipping water by fitting a valve into the bottom, as shown in the sketch. Fasten a piece of soft leather to the bottom of a block, 3 in. square, and fix this to the bottom of the bucket by means of a small hinge. By pushing the bucket bottom down into the water, the latter rises up through the valve until the bucket is full. By lifting it the valve is closed. This device fitted to a tall milk pail is especially convenient.—R. S. Matzen, Fort Collins, Colo.



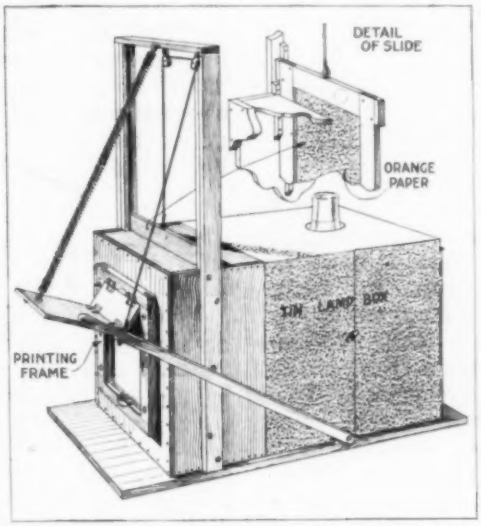
A Shoe-Polishing Strop

It is awkward to shine one's shoes with a long strip of cloth as is done by a shoe shiner to produce a high polish. An effective substitute method is to suspend from the wall a strip of cloth, about 5 in. wide, doubled to a length of 30 in., and rub the shoes on it before putting them on.

A Photographic Printing Machine

By L. B. ROBBINS

A PRINTING machine for "gaslight" papers, to be used in localities not equipped with gas or electricity and where printing is to be done after daylight, is shown in the sketch. The measurements given are only approximate, as conditions will determine its size. That shown is made as follows: First procure a 6½ by 8½-in. or 8 by 10-in. printing frame. Remove the brass clips from the pad and fasten one end of the pad to the frame, by a pair of small hinges, with the glass in the frame. Procure a box, about 12 by 15 in., by 8 in. deep, with one side open. Cut a rectangular opening through the 12 by 15-in. side a bit smaller than the printing frame, and secure the frame in place over the opening with screws. Saw a slot ¾ in. wide through the top of the box—the end nearest the hinged end of the printing frame pad—running it the full width and about 3 in. from the front.



Photographic Printing may be Done Rapidly by the Systematic Use of This Machine

Nail cleats along the inside of each side of the box, placing them vertical and parallel, and about ¾ in. apart, so as to form a slide groove in conjunction with the slot. This groove is to receive a frame or curtain constructed of stock, 2 in. wide and ½ in. thick. The outside dimensions of the curtain are a trifle smaller than the inside measurements of the box itself. Cover the frame with orange paper, and when finished insert it through the slot in the top of the box. Build a frame as indicated, on the outside of the box. Along the inside of the uprights fasten cleats, thick enough to come flush with the ends of the slot. These serve to steady the curtain when raised. Make a suitable baseboard and secure the box to it. Then with sheet tin construct a lamp house extending from the back of the box and of sufficient size to accommodate a round-wick lamp. Leave an opening in the top to admit the chimney, provide holes for ventilation, and a door by which the lamp may be adjusted. When completed, paint the interior of the box and lamp house white, to intensify the printing quality of the light. Tie a piece of stout cord to a screw eye inserted in the upper end of the sliding curtain, lead it through two pulleys fastened as shown, and down to the hand lever. The latter is pivoted at the rear end by a bolt. Attach a spring to the lower end of the hinged pad on the printing frame. This holds the pad out of the way when not in use. A curtain-roller spring is suitable for this purpose.

To operate the machine, place the negative and paper in position, and, with the left hand, bring the pad down. Pull down the hand lever with the right hand, raising the orange curtain. When the required exposure is made, release the lever, shutting off the direct light. While nearly all light is shut out by means of the lamp house, the paper may be handled safely and easily by means of that admitted through the orange curtain. By systematic ar-

rangement and handling of materials, it is surprising what an amount of work can be turned out by the aid of this machine, especially if one person attends to the exposing and another to the developing.

A Small Variable Condenser

The condenser shown in the diagram combines the large capacity of a fixed condenser with the gradual capacity

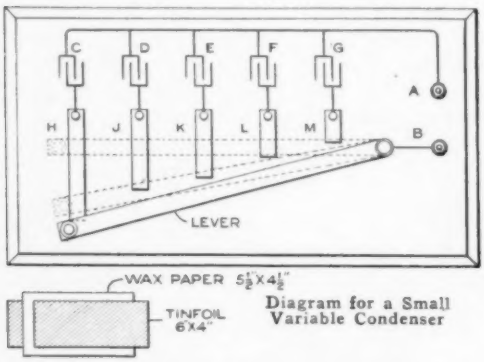


Diagram for a Small Variable Condenser

variation of a variable one. It is suitable for a wireless receiving circuit, or to shunt around the vibrator of an induction coil, by making the units considerably larger. It is made up of several fixed condensers, connected in parallel, a lever being the means whereby the capacity is varied. Five or more units may be used, each being a small condenser, built up of 10 sheets of waxed paper and nine sheets of tin foil. A convenient size for the tin foil is 6 by 4 in., and for the paper, 5½ by 4½ in. The latter should be a good grade of very thin linen paper and should be carefully prepared by dipping it in hot paraffin. The sheets of tin foil and paper in each unit are piled up alternately, allowing about ½ in. on each tin-foil strip to project beyond the paper for making connections. The pile is covered with heavy paper, and a heated flatiron is passed on the top of each unit until the paraffin begins to melt. Upon cooling, the units are compact.

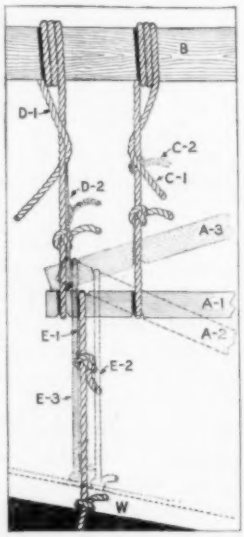
The connections necessary are shown in the diagram. The condenser units C, D, E, F, G, each have one side connected to a common terminal A. The other sides of the condensers are connected to the copper strips H, J, K, L, M. They are ½ in. wide and 1/16 in. thick. A copper lever, ⅛ by ½ by 8 in., is pivoted on one end so that it will connect two or more of the condensers in parallel. The pivoted end is connected to the terminal B. The dotted line shows different positions of the lever. The apparatus is mounted in a wooden box.—Peter J. M. Clute, Schenectady, N. Y.

Lighting a Candle without Touching the Wick

A candle may be lighted without the match flame touching the wick, as follows: Light the candle, let it burn a bit; then blow it out. A small column of smoke will rise from the wick. Touch the match flame to this, a little above the wick, and it will ignite, travel down, and relight the wick from the burning oil gas.

Emergency Lifting Device of Rope and Lever

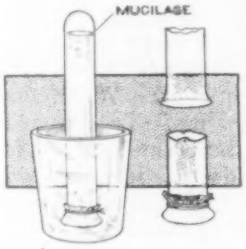
When block and tackle, chain hoists, or similar equipment are not at hand, the simple arrangement shown in the sketch is useful for lifting heavy loads. Make the lever A of a piece of 2 by 4-in. stuff, and cut notches into it for the ropes, as indicated. From a suitable support, B, fix the ropes C and D to the lever A at the proper notches, permitting the ends C-1 and D-1 to be drawn down and fastened to the floor or other support, as required in raising the load. Fix



the rope E to the load W, and suspend it from the lever A at the proper notch by means of a loop, E-1. To raise the load, bear down on the end of the lever when it is in its original position A-1, bringing it to the position A-2. This will bring the lower rope to position E-2. Draw up the slack in rope D, to bring the loop to position D-2, and fasten it. Then lift the lever A from its position A-2, to the position A-3, and draw up the slack in rope C to bring the loop up to position C-2. The lower rope will be brought to position E-3. By repeating this process, the load may be raised gradually. The ropes may, of course, be of various lengths within the range of the support and the operators.

Mucilage Brush and Container Made of a Test Tube

An ordinary test tube, about ⅝ by 6 in. in size, may be made into a mucilage container and brush that economizes the material and does not get the fingers sticky. The end of the tube is covered with a piece of soft cloth after the tube is filled, as shown in the sketch. A convenient way to care for the device is to keep it in a small tumbler.—A. H. Carrington, Trenton, N. J.



Holder for Household Ice Pick

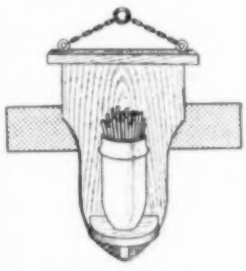
An ice pick is often a source of danger, if left lying about the home, and should be kept at a place convenient to the ice box, where it will not be likely to cause injury. The small bracket on which the ends of the roller curtain are supported is a satisfactory holder for the pick. It may be fastened to the wall with nails, or screws, so that the pick may be suspended in the center hole.—Robert J. Donnelly, Cincinnati, Ohio.

Swing Made of Hickory Sapling

A swing, so durable that it has become a virtual landmark, was made from a long, straight hickory sapling suspended from the limb of a tree. The sapling was split part of its length, as shown in the illustration, and a bolt put through it to prevent the upper portion from cracking. The lower end was smoothed off, so as not to injure the hands, and mortised through a slab of wood, as shown in the detailed sketch. A safe hook from which to suspend the swing is suggested. It is made from a bolt fixed through the limb and curled at the hook end so that the swing may be taken down in bad weather.—Hubert Kann, Pittsburgh, Pa.

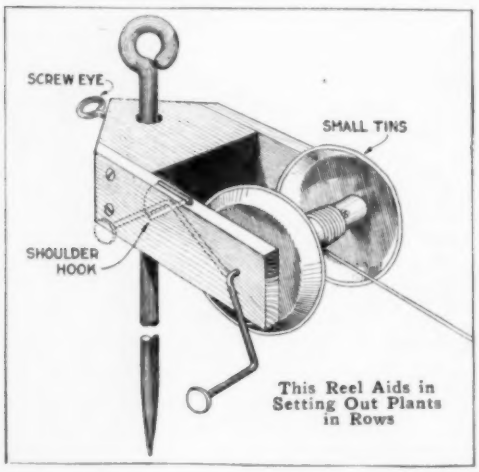
Match Safe of Miniature Cannon Shell

The match safe shown in the sketch was made by a worker in a munitions plant. The container was shaped like a small cannon shell and was set into a bracket supported on a prettily grained board, stained and varnished, and supported by a chain.—J. H. Moore, Hamilton, Can.



Reel for Use with Seed-Planting Guide String

Many gardeners derive as much pleasure from the orderly arrangement of the plants in their "farms" as from



This Reel Aids in Setting Out Plants in Rows

any other feature of this home diversion, and I am one of them. In order to facilitate the planting I made a reel like that shown in the sketch. The frame is of wood, and the reel is made of a piece of broomstick to which two small tins, or box covers, are nailed. A wire handle made of a long nail is fitted to one end, and a shoulder hook is used as a stop for the handle when it is desired to check the line. A screw eye driven into the back of the frame holds it at various heights on the stake. This device is far superior to the common use of two stakes for the planting cord.—James M. Kane, Doylestown, Pennsylvania.

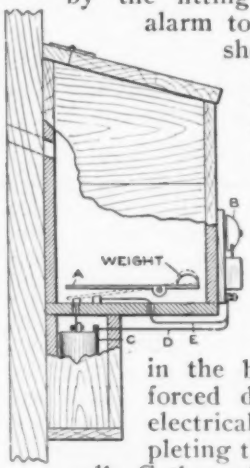
Kinks on the Care of Umbrellas

Deriving long use from an umbrella depends in part on proper selection, care of the cloth and frame, and precautions against loss or theft. A silk cover is desirable to shed rain, and a cotton one for a sunshade. The hot sun dries out the silk and heats the metal ribs under it, quickly destroying it. If silk is used for sun protection, wet the cover occasionally. Always set an umbrella to dry, handle down, if there is not space to dry it open.

A broad ribbon loop on the handle of a woman's umbrella permits carrying it on the wrist and prevents forgetting it. An umbrella with a removable handle can be folded into a suitcase, and putting the handle in the pocket when leaving the umbrella in any public place makes it less liable to theft. An umbrella should bear the name and address of the owner.

A Bell-Ringing Mail Box

The annoyance of watching for the arrival of the mailman was overcome by the fitting of an electrical alarm to the mail box, as shown in the sketch. A strip of metal, A, was pivoted in the box and weighted on one end. A bell, B, was wired to dry cells in the box below the container for the mail. When the mail is dropped in the box the end A is forced down, forming an electrical contact and completing the circuit from the cells C through the wire D and back through the wire E. When the mail is removed the weight raises the metal strip.—James E. Noble, Portsmouth, Canada.

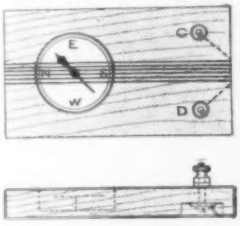


A Simple Polarity Indicator

An ordinary compass, fitted flush in a wooden frame as shown in the sketch, forms the basis for the polarity indicator described. The N, or north, and S, or south, points of the compass should run lengthwise with the frame, with the former on the end farthest from the binding posts, C and D. Five turns of No. 18 gauge, or any similar, wire are wound lengthwise around the frame and over the compass. The ends of the wires terminate at the two bind-

ing posts. Begin at C and wind toward the compass, binding the wire at D.

If the two ends of a wire are free, and it is desired to know whether there is any current present, and if so, its polarity, fasten one wire to the post C and the other to D. Before connecting the wires, hold the compass and frame in such a way that the needle is over the N point on the compass dial. If, after the wires are connected, the needle moves, there is a current flowing. If the needle is deflected toward the east, the negative wire is on C; if it is deflected toward the west, the positive wire is on C.



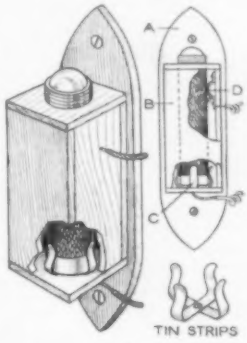
When it is desired to ascertain the polarity of a wire, which is covered by a floor, ceiling, or molding, hold the compass as explained, and either directly above or below the wire. Then turn on the current. If the instrument is above the wire, the wire extending parallel with it north and south, and the needle is deflected toward the west, the current is flowing from the north to the south end of the wire. If the wire runs east and west and the needle is deflected to the west, the current is running from west to east.

If the wire runs on a diagonal between the directions mentioned, and the needle is deflected toward the west, the current is flowing from the quadrant between N and W on the compass dial toward the quadrant between S and E. If the instrument is held over the wire and the needle is deflected toward E, the polarity is the opposite to that last indicated. Should the instrument be held below the wire, if the needle goes toward W, it is equivalent to going toward E when above the wire.—H. Sterling Parker, Brooklyn, New York.

¶If the white of an egg is used to seal an envelope which has no mucilage on the flap, it cannot be opened by steaming it.

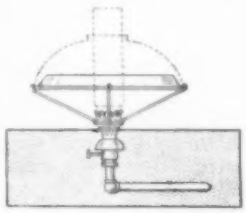
Flash Light Used as a Bedroom Night Light

To save groping about in the dark for my flash light when suddenly awakened in the night, I devised the arrangement shown in the sketch and by which a "flash" is used as a wall night light, without lessening its common uses. The holder B and the board A are of wood, and into the box is fitted a metal clip, C, to hold the light. A round hole of proper size is cut through the top of the box and the light set through it so that the bottom end rests in the clip, the tin ferrule pressing against it firmly. A light spring, D, makes contact with the upper terminal of the push switch without closing it. The apparatus is fastened to the wall, and insulated wires, soldered, one to the clip C, and the other to the spring D, are connected to a switch placed in a convenient position. This switch replaces that on the light. The ceiling serves to reflect and distribute the light rays.—B. L. Dobbins, Harwich, Mass.

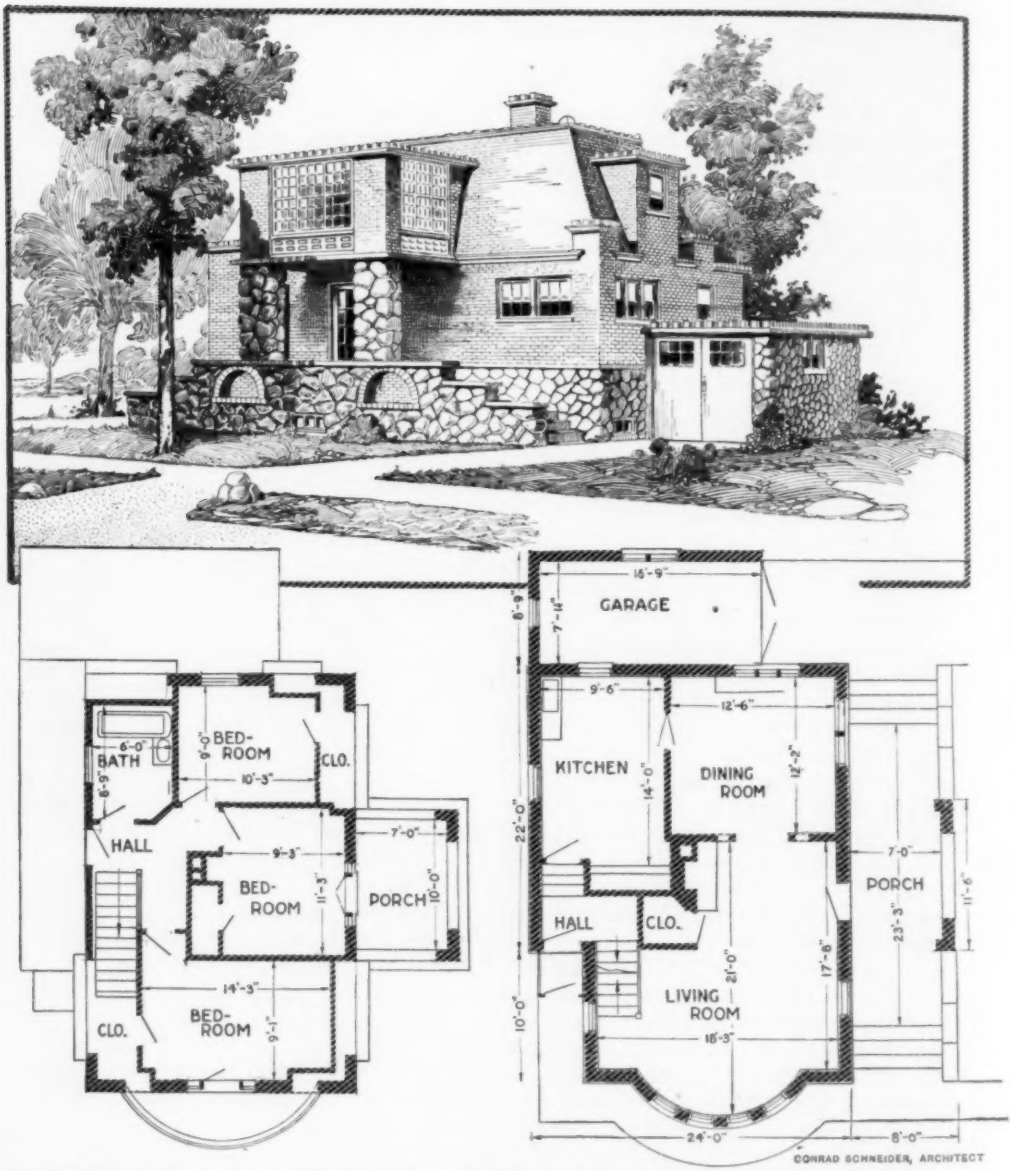


Pie-Plate Gas Heater

A satisfactory gas heater to take the chill out of the air in a small room by fitting a pie plate over a gas burner was made by me, as shown in the sketch. The wires which formerly held the glass shade were fitted into holes punched in the rim of the plate. It could thus be removed quickly when not needed and the glass shade put back in place.—Morris Tinsky, Chicago, Illinois.



DISTINCTIVE ARCHITECTURE IN MODEST HOUSE



RELIEF from the monotony of stereotyped lines has been attained in a residence of moderate cost erected in one of Chicago's suburbs. Bowlders form the foundation, porch, and garage walls, and support a large sleeping porch that overhangs the veranda. The main walls are finished in brick, that is surmounted by the tile of the steep-sided roof. Steps at either end of the porch give access to the front door, which opens into a large living room. The garage, a part of the building, is connected with the kitchen. Adequate light, roomy closets, a conveniently located toilet, and a general absence of waste space are attractive points pertinent to the arrangement. The cost of construction is about $3,600.

IN accordance with the editorial policy of this magazine never to accept compensation in any form for what appears in our reading pages, and also to avoid all appearance of doing so, we are obliged to omit the name of the maker or the seller of any article described. This information, however, is kept on file and will be furnished free, by addressing Bureau of Information, Popular Mechanics Magazine, Chicago. [Editor.]